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Clayton
ENVIRONMENTAL
CONSULTANTS

MEMORANDUM

To: Frank LaPointe, Clark Refining & Marketing
John Berghoff, Mayer Brown & Platt

From: Monte Nienkerk

Subject: DATA GENERATED DURING A SOIL INVESTIGATION BETWEEN AUGUST 18, 1999 AND AUGUST 25, 1999 AT THE CLARK OIL COMPANY'S BLUE ISLAND REFINERY

Date: October 12, 1999

Clayton completed a review of a summary table (provided by Clark) that describes past spills and releases at the Clark facility. In addition, Clayton personnel met with personnel from Clark's Environmental Department to tour the facility and to obtain additional information concerning past spills. Table 1 describes those spills or releases (from the Clark summary table) that could have potentially impacted soil. This table also cross-references the spill/release summary table previously supplied to the regulatory authorities. These past spills or releases are shown on Figure 1.

Two items (7 and 10) were not considered since the releases did not contain hydrocarbons. Items 16 and 25 were not considered since: either the location of the release is not known (item 25), or it is not known if there was a release or its location (item 16). Item 23 is not proposed for investigation since the release was small (75 gallons), and the area is unknown.

The locations of the proposed 10 free-phase hydrocarbon recovery wells are shown on Figure 1. A review of the proposed locations of these wells shows that five of the wells are positioned in the area of known past releases. These include the following:

- One proposed well in the Main Refinery west of Tank 37. This is in the area of Table 1, Item Number 1.
- One proposed well in Southwest Property Tank Farm near Tank 47. This is in the area of Table 1, Item Numbers 6 and 12.
- One proposed well in the Southwest Property Tank Farm near Tank 55. This is in

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(Continued)

the area of Table 1, Item Number 19.

- Two proposed wells in the Northwest Property Tank Farm – one near Tank 801 and one near Tank 807. These two wells are in the area of Table 1, Item Numbers 3, 9, and 15.

The locations of the remaining proposed recovery wells do not directly correlate with a past spill location. Those past spill locations that do not appear to correlate with the proposed recovery well locations include: Table 1, Item Number 2 in the Main Refinery; Table 1, Items Number 4, 5, and 14 near the marine dock in the Southwest Property Tank Farm; Table 1, Item Number 8 at Tank 804 in the Northwest Property Tank Farm; and Table 1, Items Number 11, 13, 17, 18, 20, 21, 22 and 24 located in the north half of the Southwest Property Tank Farm. Items 11, 13, and 22 in Table 1 are assumed to be in the Southwest Property Tank Farm since the releases were benzene, and benzene is stored only in this area.

After review, Clayton identified four areas (labeled A, B, C, and D on Figure 1) for further investigation. Included on Figure 1 are the locations of the soil borings completed by Clayton to investigate these areas.

Area A – Main Refinery

This area was investigated to assess the past release identified as Table 1, Item Number 2; to further investigate the extent of the release identified as Table 1, Item Number 1; and to evaluate the subsurface conditions between Tanks 37 and 38. Clayton completed soil borings at three locations in this area. CSB-01 is located east of the containment dike around Tank 36; CSB-02 is located between Tanks 37 and 38; and CSB-03 is located just north of the containment dike around Tank 35.

Area B – Southwest Property Tank Farm between Marine Dock and Tanks 51 and 52

This area was investigated to determine if any free-phase hydrocarbons have migrated beyond the proposed location of the recovery well located at the southeast corner of Tank 52 and to assess the past releases identified as Table 1, Items Number 4, 5, and 14. Clayton completed soil borings CSB-04 and CSB-05 in this area.

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(Continued)

Area C – Southwest Property Tank Farm along Road on North Side of Tanks 53 and 54

This area was investigated to assess the past releases identified as Table 1, Items Number 11, 13, 17, 18, 20, 21, 22, and 24. The investigation further assesses the impact from release Table 1, Item Number 12. Clayton completed five soil borings (CSB-07 through CSB-11) in this area.

Area D – Northwest Property Tank Farm in the Area of Tank 804

This area was investigated to assess the past release identified as Table 1, Item Number 8. Clayton completed soil boring CSB-06 in this area.

A final soil boring (CSB-12) was completed in the area of Tank 56 to investigate if any free phase hydrocarbons have migrated beyond the proposed location of the recovery wells located near Tanks 55 and 401.

Clayton used its hydraulic probe unit (HPU – direct push method) to complete the 12 soil borings identified above. These soil borings were completed to depths ranging from 15 to 28 feet below ground surface (bgs). The soils where classified by Clayton geologists and visually inspected for the presence of free phase hydrocarbons. A photoionization detector (PID) with a 10.2 ev lamp was used to perform a headspace screening of the soil samples for the presence of hydrocarbons. The boreholes were backfilled with bentonite chips.

Soil boring logs for the 12 completed soil borings are attached. A review of these logs shows that the soils beneath the Clark facility generally consist of lacustrine silts and sands that overlie a zone of peat and clay containing shells. The lacustrine deposits overlie a glacial till. The lacustrine silts and sands vary in thickness from less than 9 feet thick to greater than 15 feet thick. The peat and clay zone varies in thickness from less than 0.5 feet thick to approximately 1.5 feet thick. All of the soil borings terminated in the glacial till. Therefore, the total thickness of the glacial till unit was not determined. However, at soil boring CSB-12, refusal was encountered at 28.5 feet bgs. This may represent the bedrock surface or weathered bedrock surface in this area.

Visible signs of free phase hydrocarbons were noted in soil borings completed at CSB-01 and CSB-10. At CSB-01, free phase hydrocarbons were encountered at approximately 4 feet bgs and at approximately 12 feet bgs. At CSB-10, free phase hydrocarbons were encountered at 5 feet bgs.

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(Continued)

Table 2 provides the results of the PID headspace screening of the soil samples. The PID readings are also recorded on the soil boring logs. Elevated PID readings were reported for soil samples collected from CSB-01, CSB-03, CSB-04, CSB-05, CSB-10, and CSB-11. At CSB-03, the only saturated soil that was encountered occurred within a thin, fine gravel lens at a depth of 9.1 to 9.3 feet bgs. The highest PID reading measured at CSB-03 was from a soil sample collected at a depth interval of 4 to 6 feet bgs. Because no PID reading exceeded 50 at a depth greater than 9 feet, installation of a recovery system at this location does not seem appropriate.

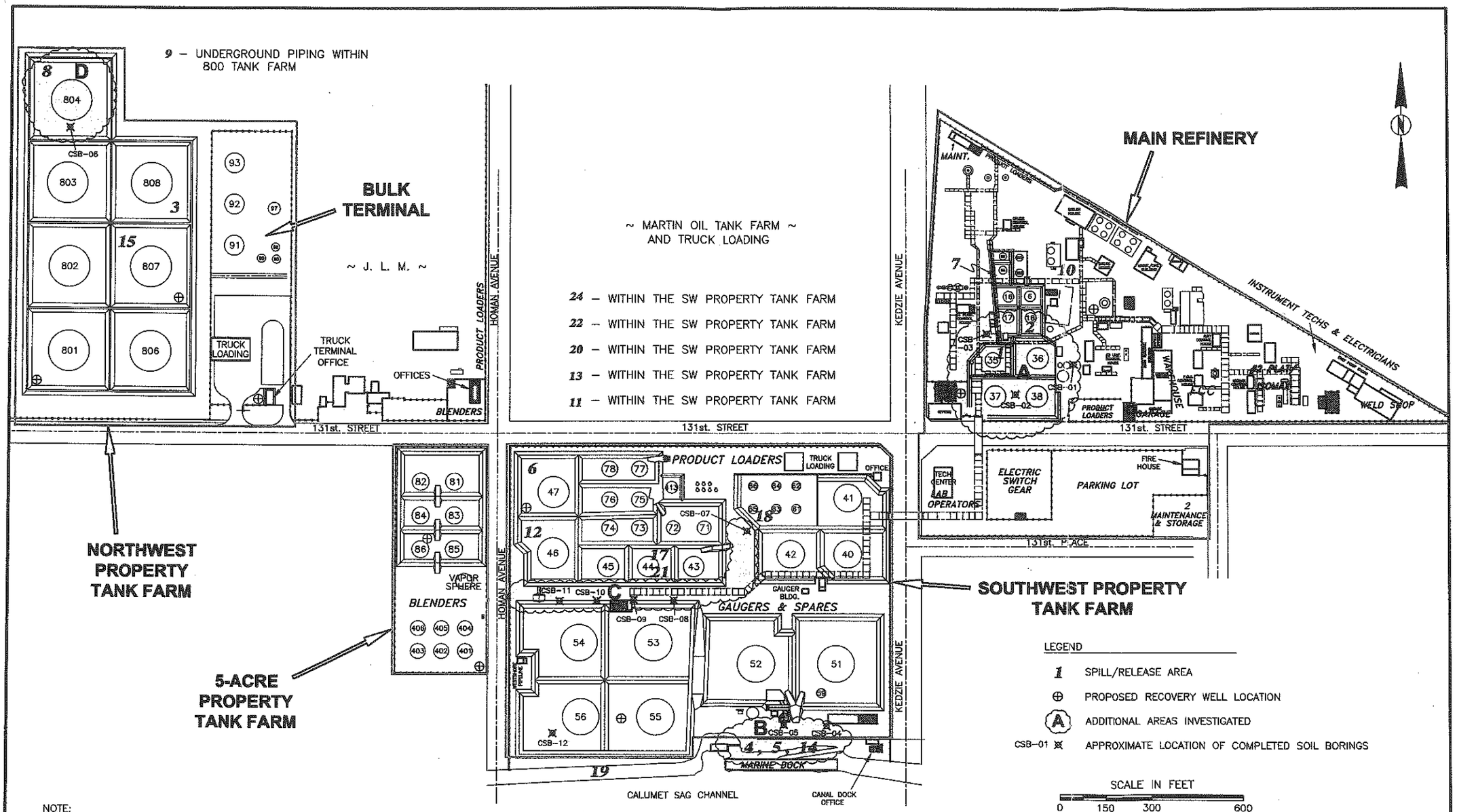
Based on the above information, the following recommendations are made.

1. An additional free phase hydrocarbon recovery well should be located at soil boring CSB-01. This is in the main refinery area (Area A), east of the containment dike around Tank 36. Visible signs of free phase hydrocarbons and elevated PID readings were observed at this location.

2. A free phase hydrocarbon recovery trench should be located in the area of soil borings CSB-04 and CSB-05. This is in the Southwest Property Tank Farm between the marine dock and Tanks 51 and 52 (Area B). No visible signs of free phase hydrocarbons were observed in this area; however, elevated PID readings were recorded in the saturated zone at both of these soil borings. These elevated PID readings indicate the possible presence of free phase hydrocarbons. The proposed recovery trench should be installed instead of the proposed recovery well at this location.

3. A free phase hydrocarbon recovery trench should be located in the area of soil borings CSB-10 and CSB-11. This is in the Southwest Property Tank Farm north of Tank 54 (Area C). Visible signs of free phase hydrocarbons were observed at CSB-10. Even though no visible signs of free phase hydrocarbons were observed at CSB-11, elevated PID readings (indicating the possible presence of free phase hydrocarbons) were recorded in the saturated zone of this soil boring. The proposed recovery trench should be installed instead of the proposed recovery well at the Tank 47 location.

FIGURE



NOTE:

SPILL/RELEASE ITEM 16 IS NOTED AS A PLANT–WIDE POWER OUTAGE THEREFORE NO SPECIFIC AREA IS SHOWN ON FIGURE.

SPILL/RELEASE ITEM 23 IS ONLY IDENTIFIED AS A GASOLINE LEAK FROM A STORAGE TANK. THE LOCATION OF THE STORAGE TANK IS NOT SPECIFIED.

SPILL/RELEASE ITEM 25 IS ONLY IDENTIFIED AS A GASOLINE LEAK FROM A STORAGE TANK. THE LOCATION OF THE STORAGE TANK IS NOT SPECIFIED.

REVISION 1 - 9-29-99 - ADD BORING DESIGNATIONS
REVISION 0

CHECK BY	MMN
DRAWN BY	BCP
DATE	9–20–99
SCALE	AS SHOWN
CAD NO.	0003610B
PRJ NO.	19036.10

PAST SPILL RELEASE SUMMARY AND SOIL BORINGS COMPLETED BETWEEN AUGUST 18 & 25, 1999

CLARK REFINING MARKETING, INC.
BLUE ISL ILLINOIS

Clayton ENVIRONMENTAL CONSULTANTS
Div. of Clayton Group Services, Inc.

FIGURE 1

TABLES

TABLE 1
Past Spill Release Summary to Land/Groundwater

Clark Refining & Marketing, Inc. / Blue Island, Illinois

Clayton #	Clark #	Spill Date	NRC Report #	IEMA Incident #	Material	Quantity	Location	Response	Addressed By
1	86	December 30, 1998	None	983185	Diesel	2,000 gallons	Tank 35 relief valve broken	All liquid material recovered by vac truck and placed into refinery recycle system.	Area A investigation - Recovery Well west of Tank 37
2	85	December 28, 1998	None	983167	Naphtha	260 gallons	Tank 18 line leak	All liquid material recovered by vac truck and placed into refinery recycle system.	Area A investigation - Recovery Well west of Tank 37
3	84	December 15, 1998	None	983075	Gasoline	10,000 gallons	Tank 808 dike - drain nipple broke off	All liquid material recovered by vac truck and placed into refinery recycle system.	Recovery Well at Tank 807
4	82	April 5, 1998	None	980736	Gas Oil	100 gallons	Gas oil spill at dock	Material recovered by vac truck and placed in Refinery Recycle system. Rock and soil removed and disposed.	Area B investigation
5	81	December 12, 1997	415503	972375	Wastewater (benzene)	7,500 gallons	2-inch recycle line on a waste water treatment system		Area B investigation
6	80	November 2, 1997	409925	972107	Gasoline	56,000 barrels	AST #47 failure	All liquid material recovered by vac truck and placed into refinery recycle system.	Recovery Well at Tank 47
7	71	October 7, 1997	406541	971902	Caustic solution (sodium hydroxide and sodium hydrosulfide)	42,000 gallons	Released from AST #28. Spilled from dike.	All liquid material recovered by vac truck and shipped off-site for disoposal.	Not Applicable - Caustic Solution
8	68	September 17, 1997	404040	971745	Crude oil (42 pounds benzene)	60,000 gallons	Crude oil tank 804	All liquid material recovered by vac truck and placed into refinery recycle system.	Area D investigation
9	60/59	April 12, 1997	383433	970624	Gasoline	200,000 gallons	Underground piping		Recovery Wells at Tank 801 and 807
10	55	August 26, 1996	None	None	Sulfuric acid	200 gallons	Platformer cooling tower		Not Applicable - Acid
11	54	April 8, 1996	335275	960563	Benzene	36 pounds	Southwest Tank Farm	Contaminated soil was excavated and sent for disposal	Area C investigation
12	53	March 12, 1996	330763	960408	Benzene	20,000 barrels	Tank 46 dike	Contaminated soil was excavated and sent for disposal	Area C investigation - recovery well at Tank 47
13	51	October 29, 1995	312371	None	Benzene	15 gallons	Southwest Tank Farm		Area C investigation
14	47	May 11, 1995	291030	951005	Benzene	Unknown	Canal dock	Contaminated soil was excavated and sent for disposal	Area B investigation
15	45	March 31, 1995	285161	950641	Gasoline	500 gallons	24" underground pipe leak 807 tank dike	Liquid material was recovered by vac truck and palced in refinery recycle system. Contaminated soil was disposed.	Recovery Well at Tank 807
16	40	March 9, 1995	None	None	Gasoline component	Unknown	Plant-wide power outage		Not applicable - nondescript
17	39	February 9, 1995	279187	950278	Petroleum naphtha	500 gallons	Tank 44 dike	Liquid material was recovered by vac truck and palced in refinery recycle system. Contaminated soil was disposed.	Area C investigation

TABLE 1
Past Spill Release Summary to Land/Groundwater

Clark Refining & Marketing, Inc. / Blue Island, Illinois

Clayton #	Clark #	Spill Date	NRC Report #	IEMA Incident #	Material	Quantity	Location	Response	Addressed By
18	35	November 3, 1994	268176	950605	Fuel oil and gasoline	10 barrels	Tank 65 dike		Area C investigation
19	30	August 23, 1994	256968	942481	Gasoline	250 gallons	Tank farm (from 6" line to Channel)		Recovery Well at Tank 55
20	27	August 9, 1994	254360	941779	Benzene	200 gallons	Southwest Tank Farm (underground pipe leak)		Area C investigation
21	19	May 23, 1994	240712	941715	Petroleum naphtha	300 gallons	Tank 44		Area C investigation
22	17	May 12, 1994	None	941153	Benzene	20 gallons	Released from pinhole leak in an underground 4" benzene transfer line. SW tank farm.		Area C investigation
23	8	December 22, 1993	213709	933266	Gasoline	75 gallons	Storage tank leak in 8- or 16-inch line		Unknown area
24	3	December 20, 1992	139647	None	Benzene	Unknown	Underground pipeline/SW Tank Farm		Area C investigation
25	1	March 7, 1992	109643	920621	Gasoline-unleaded	4,445 gallons	AST		Unknown area

TABLE 2
Photoionization Detector - Soil Headspace Readings from Soil Borings
Completed between August 18, 1999 and August 25, 1999

Clark Refinery and Marketing, Inc. / Blue Island, Illinois

Sample Depth (feet BGS)	SOIL BORING NUMBER											
	CSB-01	CSB-02	CSB-03	CSB-04	CSB-05	CSB-06	CSB-07	CSB-08	CSB-09	CSB-10	CSB-11	CSB-12
1											40 - 70	
2	40	2.5	25	7.5	86	1.6	0.2	0.7	0.6	9.7		0
3											500 - 800	
4	280	10.4	121	6.5	52	1.7	0.5	0.4	0.8	22		
5											200 - 800	
6	280	2.6	240	10.9	158	1.5	0.3	1.0	2.0	1,000	300 - 500	
7	150										40 - 120	0
8		3.1	100	52	200	1.5	0.4	1.1	1.0	880		
9											300	
10		2.1	44		200			1.0	0.7	560	10	
11											5 - 10	0
12	44	2.3	14	144	69	2.3	0.3	0.9	0.8	290		
13											30	0
14	240	1.3	18		65	1.2	0.3	0.9	0.8	54		
15	3.6	1.5									5	0
16		E.O.B	5.5	30	45	4.2	0.3	0.5	0.6	21		
17				5.7				E.O.B	E.O.B	E.O.B	10 - 30	0
18	4.3		11		80		0.4					
18.1	E.O.B				24		E.O.B					
19				70	E.O.B						1	0
20			38	E.O.B		1.3					1.5	
21			E.O.B			E.O.B					E.O.B	0
22												
23												0
24												
25												0
26												
27												0
28												0
29												E.O.B

NOTES: BGS = Below Ground Surface
EOB = End of Boring

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SOIL BORING LOGS

Boring / Well No.:	CSB-01	Start Date & Time:	8/18/1999 1002	Boring Location / Coordinates:	
Logged By:	K. Comire	Finish Date & Time:	8/18/1999 1400		
Project Name:	Clark Refining & Marketing, Inc.	Project No.:	15-99036.10-001	Refer to Site Plan	N
Project Location:	Blue Island, IL				
Drilling Co.:	Clayton Env.	Drilling Equipment:	Hydraulic probe unit		
Driller:	N. Bolivar	Drilling Method:	Direct push		
Ground Elevation:	NA	Top of Casing Elevation:	NA		
Borehole Dia.:	2"	Development Method:	NA		
Outer Casing Dia / Material / Length:		NA			
Inner Casing Dia. / Material / Length:		NA			
Screen Interval / Material / Slot size:		NA			
First Water: 4.0 feet		Static Water:			
Date: 8/18/1999		Date:			
Time (hrs):		Time:		Surface Conditions:	Asphalt

DEPTHS Top	DEPTHS Bottom	DESCRIPTION	GRAPHICS	SAMPLE INFORMATION I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks Scan	PID or FID Measurements / Remarks Headspace
0	0.3	**ASPHALT**	ASPH								
0.3	6.9	**FILL** - Silty Clay stained black, moist w/ some fine-coarse Sand and fine Gravel. Heavy black staining from 2.0-3.0 feet, wet, visible free product on tube, Sand and Gravel decreasing w/ depth. Saturated at approximately 4.0 feet, visible free product. Coarse Sand, black, saturated from 5.5-6.9 feet.	FILL	A	0 to 2	1.7 / 1.7		— / M		7.0	40
				B	2 to 4	1 / 2		W		7.0	280
				C	4 to 6	2 / 2		S		20	280
				D	6 to 8	1.5 / 2		S / M		7.0	150
6.9	7.5	**CLAYEY SILT** (CL-ML) - Gray, moist.	CL-ML								
7.5	8.0	NO RECOVERY						—			
8.0	12.0*	**SILTY CLAY** (CL) - Dark gray w/ black staining, moist.	CL	E	8 to 12	1.7 / 4		M		5.0	44
12.0*	12.8*	**SAND** (SP) - Black, fine, saturated, w/ medium-coarse Sand and fine Gravel, visible free product.	SP	F	12 to 14	2 / 2		S / M		5.0	240
12.8	18.0	**CLAY** (CL) - Gray brown, moist, soft w/ shells from 12.8-13.6 feet.	CL								

Boring / Well No.: CSB-01	Start Date & Time: 8/18/1999 1002	Finish Date & Time : 8/18/1999 1400
Project Name: Clark Refining & Mkt., Inc.	Project No.: 15-99036.10-001	Logged By: K. Comire

DEPTHS		DESCRIPTION	GRAPHICS	SAMPLE INFORMATION							
Top	Bottom			I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks: Scan	PID or FID Measurements / Remarks: Headspace
12.8	18.0	**CLAY** (CL) - continued Grades to Silty Clay - Gray, moist, hard, trace fine-coarse Sand.	CL	G	14 to 15	1 / 1		M		5.0	3.6
				H	15 to 18	3 / 3		M		0	4.3
		END OF BORING AT 18.0 FEET									
		* Estimated depths - Sediments extruded from sampler due to shattered tube									

Boring / Well No.:	CSB-02	Start Date & Time:	08/18/99 1427	Boring Location / Coordinates:	
Logged By:	K. Comire	Finish Date & Time :	08/18/99 1515		
Project Name:	Clark Refining & Marketing, Inc.	Project No.:	15-99036.10-001	Refer to Site Plan	N
Project Location:	Blue Island, IL				
Drilling Co.:	Clayton Env.	Drilling Equipment:	Hydraulic probe unit		
Driller:	N. Bolivar	Drilling Method:	Direct push		
Ground Elevation:	NA	Top of Casing Elevation:	NA		
Borehole Dia.:	2"	Development Method:	NA		
Outer Casing Dia / Material / Length:			NA		
Inner Casing Dia. / Material / Length:			NA		
Screen Interval / Material / Slot size:			NA		
First Water: 10.0 feet		Static Water:			
Date: 8/18/99		Date:			
Time (hrs):		Time:		Surface Conditions:	Gravel

DEPTHS Top	DEPTHS Bottom	DESCRIPTION	GRAPHICS	SAMPLE INFORMATION I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks Scan	PID or FID Measurements / Remarks Headspace
0	0.6	**GRAVEL**	FILL	A	0 to 2	2 / 2		— / M		0	2.5
0.6	2.9	**FILL** - Silty Clay, gray brown, moist, trace fine-coarse Sand and fine Gravel.									
2.9	10.0	**SILTY CLAY** (CL) - Black, moist, grades dark gray and harder at 3.9 feet. Grades gray, brown w/ orange mottles at 4.0 feet. Peat lens - Dark brown, moist from 7.8-8.0 feet. Apparent scattered petroleum-like stains on outside of matrix from 8-10 feet.	CL	B	2 to 4	2 / 2		M		0	10.4
				C	4 to 6	2 / 2		M		0	2.6
				D	6 to 8	2 / 2		M		0	3.1
				E	8 to 10	2 / 2		M		0	2.1
10.0	10.8	**PEAT** (PT) - Black, saturated	PT	F	10 to 12	2 / 2		S / M		0	2.3
10.8	15.0	**CLAY** (CL) - Gray brown, moist, soft, w/ shells from 10.8-12.0 feet. Silty Clay (CL) - Dark gray, moist, trace fine-coarse Sand and Gravel.	CL	G	12 to 14	2 / 2		M		0	1.3

Boring / Well No.: CSB-02	Start Date & Time: 8/18/1999 1427	Finish Date & Time : 8/18/1999 1515
Project Name: Clark Refining & Mkt., Inc.	Project No.: 15-99036.10-001	Logged By: K. Comire

DEPTHS		DESCRIPTION	GRAPHICS	SAMPLE INFORMATION							
				I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks	
Top	Bottom									Scan	Headspace
10.8	15.0	CLAY (CL) - continued END OF BORING AT 15.0 FEET	CL	H	14 to 15	1 / 1		M		0	1.5

Boring / Well No.:	CSB-03	Start Date & Time:	08/18/99 1555	Boring Location / Coordinates:	
Logged By:	K. Comire	Finish Date & Time:	08/18/99 1740		
Project Name:	Clark Refining & Marketing, Inc.	Project No.:	15-99036.10-001	Refer to Site Plan	N
Project Location:	Blue Island, IL				
Drilling Co.:	Clayton Env.	Drilling Equipment:	Hydraulic probe unit		
Driller:	N. Solivar	Drilling Method:	Direct push		
Ground Elevation:	NA	Top of Casing Elevation:	NA		
Borehole Dia.:	2"	Development Method:	NA		
Outer Casing Dia / Material / Length:			NA		
Inner Casing Dia. / Material / Length:			NA		
Screen Interval / Material / Slot size:			NA		
First Water: 9.1		Static Water:	-		
Date: 8/18/99		Date:			
Time (hrs):		Time:		Surface Conditions: Gravel (C6) stained black	

DEPTHS Top	DEPTHS Bottom	DESCRIPTION	GRAPHICS	SAMPLE INFORMATION I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks Scan	Headspace
0	2.2	**FILL** - Sand, Gravel, and Clay, dark gray to black, dry.	FILL	A	0 to 2	1 / 2		D		0	25
2.2	10.4	**SILTY CLAY** (CL) - Dark gray w/ black oil-like staining, moist, soft, trace fine-coarse Sand.	CL	B	2 to 4	2 / 2		M		5.0	121
		Grades gray and harder at 3.9 feet.		C	4 to 6	2 / 2		M		3.0	240
		Orange mottles visible at 6.0 feet.		D	6 to 8	2 / 2		M		3.0	100
		Fine Gravel lens - Saturated from 9.1-9.3 feet.		E	8 to 10	2 / 2		M / S / M		0	44
		Grades dark gray, softer w/ trace roots at 10 feet.		F	10 to 12	2 / 2		M		0	14
10.4	11.9	**PEAT** (PT) - Dark brown, moist	PT								
11.9	20.0	**CLAY** (CL) - Gray brown, moist, soft w/ shells.	CL	G	12 to 14	1.7 / 2		M		—	18

Boring / Well No.: CSB-03	Start Date & Time: 8/18/1999 1555	Finish Date & Time: 8/18/1999 1740
Project Name: Clark Refining & Mkt., Inc.	Project No.: 15-99036.10-001	Logged By: K. Comire

DEPTHS		DESCRIPTION	GRAPHICS	SAMPLE INFORMATION							
										PID or FID Measurements / Remarks	
Top	Bottom			I.D.	Interval	Recovery	Method	Moisture	Blow Count	Scan	Headspace
11.9	20.0	**CLAY** (CL) - continued Grades to Silty Clay (CL) - Dark gray, moist, harder w/ trace fine-coarse Sand at 14.8 feet.	CL	H	14 to 16	2 / 2		M		—	5.5
				I	16 to 18	1 / 2		M		0	11
				J	18 to 20	2 / 2		M		0	38
		END OF BORING AT 20.0 FEET									

Boring / Well No.:	CSB-04	Start Date & Time:	08/19/99 0845
Logged By:	K. Comire	Finish Date & Time:	08/19/99 1105
Project Name:	Clark Refining & Marketing, Inc.	Project No.:	15-99036.10-001
Project Location:	Blue Island, IL		
Drilling Co.:	Clayton Env.	Drilling Equipment:	Hydraulic probe unit
Driller:	N. Bolivar	Drilling Method:	Direct push
Ground Elevation:	NA	Top of Casing Elevation:	NA
Borehole Dia.:	2"	Development Method:	NA
Outer Casing Dia / Material / Length:		NA	
Inner Casing Dia. / Material / Length:		NA	
Screen Interval / Material / Slot size:		NA	
First Water:		Static Water:	
Date: 8/19/99		Date:	
Time (hrs):		Time:	

Boring Location / Coordinates:

Refer to Site Plan

N

Surface Conditions: Asphalt

DEPTHS Top	DEPTHS Bottom	DESCRIPTION	GRAPHICS	SAMPLE INFORMATION I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks Scan	PID or FID Measurements / Remarks Headspace
0	0.3	**ASPH**ALT	ASPH								
0.3	0.7	FILL - Sand and Gravel.	FILL								
0.7	6.6	**CLAYEY SILT** (CL-ML) - Gray w/ black staining, moist.	CL-ML	A	0 to 2	1 / 1.7		D / M		0	7.5
		Grades gray brown at 3.7 feet.		B	2 to 4	2 / 2		M		0	6.5
		Silty Clay lens - Gray from 5.2-5.5 feet.		C	4 to 6	2 / 2		M		0	10.9
		Silty Sand lens - Gray, saturated from 6.4-6.6 feet.		D	6 to 8	2 / 2		M / S / M		0	52
6.6	15.0*	**SILTY CLAY** (CL) - Black, moist, trace roots.	CL	E	8 to 12	4 / 4		M		---	144
		Grades gray w/ orange mottles and black staining at 8.0 feet.									
		Sandier w/ increasing depth.									
		Grades gray w/ orange mottles, saturated and softer at 12.0 feet.		F	12 to 16	4 / 4		S / M		0	30
15.0*	15.5*	**PEAT** (PT) - Dark brown, moist.	PT								

Boring / Well No.: CSB-04	Start Date & Time: 8/19/1999 0845	Finish Date & Time : 8/19/1999 1105
Project Name: Clark Refining & Mkt., Inc.	Project No.: 15-99036.10-001	Logged By: K. Comire

DEPTHS		DESCRIPTION	GRAPHICS	SAMPLE INFORMATION							
										PID or FID Measurements / Remarks	
Top	Bottom			I.D.	Interval	Recovery	Method	Moisture	Blow Count	Scan	Headspace
15.5*	19.2	CLAY (CL) - Gray, moist, soft w/ shells. Grading dark gray, harder at 17.1 feet. Saturated w/ some fine-coarse Sand and fine Gravel at 17.2 feet. END OF BORING AT 19.2 FEET	CL	H	16 to 17.2	1.2 / 1.2		M		0	5.7
				I	17.2 to 19.2	0.4 / 2		S		7	70
		* Estimated depth - Sediments extruded from sampler due to shattered tube.									

Boring / Well No.:	CSB-05	Start Date & Time:	08/19/99 1114	Boring Location / Coordinates:	
Logged By:	K. Comire	Finish Date & Time :	08/19/99 1235		
Project Name:	Clark Refining & Marketing, Inc.	Project No.:	15-99036.10-001	Refer to Site Plan	N
Project Location:	Blue Island, IL				
Drilling Co.:	Clayton Env.	Drilling Equipment:	Hydraulic probe unit		
Driller:	N. Bolivar	Drilling Method:	Direct push		
Ground Elevation:	NA	Top of Casing Elevation:	NA		
Borehole Dia.:	2"	Development Method:	NA		
Outer Casing Dia / Material / Length:			NA		
Inner Casing Dia. / Material / Length:			NA		
Screen Interval / Material / Slot size:			NA		
First Water: 5.8		Static Water:			
Date: 8/19/99		Date:			
Time (hrs):		Time:		Surface Conditions: Gravel	

DEPTHS Top	DEPTHS Bottom	DESCRIPTION	GRAPHICS	SAMPLE INFORMATION I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks: Scan	Headspace
0	2.6	**FILL** - Sand, brown, moist, fine w/ some medium-coarse Sand, Gravel and Silt. Gravel lens - fine-medium, from 1.9-2.6 feet. Black stained above gravel.	FILL	A	0 to 2	1.5 / 2		M		0	86
2.6	15.3	**SILTY CLAY** (CL) - Gray brown, trace shells w/ black staining from 2.6-12.0 feet.	CL	B	2 to 4	2 / 2		M		2.0	52
		Black lens from 5.5-5.6 feet and 5.9-6.4 feet.		C	4 to 6	2 / 2		M / S		0	158
		Saturated, soft w/ trace fine sand at 5.8 feet.		D	6 to 8	2 / 2		S		100	200
		Some fine Sand from 8.0-14.2 feet.		E	8 to 10	1.2 / 2		S		7.0	200
		Orange mottles from 10.0-15.3 feet.		F	10 to 12	2 / 2		S		5.0	69
		Moist at 12.0 feet.		G	12 to 14	2 / 2		M		2.0	65

Boring / Well No.: CSB-05	Start Date & Time: 8/19/1999 1114	Finish Date & Time : 8/19/1999 1235
Project Name: Clark Refining & Mkt., Inc.	Project No.: 15-99036.10-001	Logged By: K. Comire

DEPTHS Top	DEPTHS Bottom	DESCRIPTION	GRAPHICS	SAMPLE INFORMATION I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks: Scan	PID or FID Measurements / Remarks: Headspace
2.6	15.3	SILTY CLAY (CL) - continued	CL	H	14 to 16	2 / 2		M		2.0	45
15.3	16.9	PEAT (PT) - Dark brown, moist. Sheening observed in 12-16 sampling tube.	PT	I	16 to 18	2 / 2		M		0	80
16.9	18.1	CLAY (CL) - Gray, moist w/ shells. REFUSAL at 18.1 - limestone chips in tip of samp tube.	CL	J	18 to 18.1	0.1 / 0.1		M		---	24

Boring / Well No.:	CSB-06	Start Date & Time:	08/19/99 1425
Logged By:	K. Comire	Finish Date & Time :	08/19/99 1650
Project Name:	Clark Refining & Marketing, Inc.	Project No.:	15-99036.10-001
Project Location:	Blue Island, IL		
Drilling Co.:	Clayton Env.	Drilling Equipment:	Hydraulic probe unit
Driller:	N. Bolivar	Drilling Method:	Direct push
Ground Elevation:	NA	Top of Casing Elevation:	NA
Borehole Dia.:	2"	Development Method:	NA
Outer Casing Dia / Material / Length:			NA
Inner Casing Dia. / Material / Length:			NA
Screen Interval / Material / Slot size:			NA
First Water: 2.6 feet	Static Water:		
Date: 8/19/99	Date:		
Time (hrs):	Time:		

Boring Location / Coordinates:

Refer to Site Plan

N

Surface Conditions: Gravel coarse

DEPTHS Top	DEPTHS Bottom	DESCRIPTION	GRAPHICS	SAMPLE INFORMATION I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks Scan	PID or FID Measurements / Remarks Headspace
0	0.3	**GRAVEL**	FILL								
0.3	2.6	**SILTY CLAY** (CL) - Dark gray w/ black staining, moist.	CL	A	0 to 2	1.4 / 2		M		0	1.6
2.6	8.0	**CLAYEY SILT** (CL-ML) - Gray w/ orange mottles, saturated.	CL-ML	B	2 to 4	2 / 2		M / S		0	1.7
				C	4 to 6	1.4 / 2		S		0	1.5
		Grades gray at 6.7 feet.		D	6 to 8	2 / 2		S		0	1.5
8.0*	8.3*	**SILTY CLAY** (CL) - Black, moist w/ peat.	CL								
8.3*	9.8*	**PEAT** (PT) - Dark brown, moist.	PT	E	8 to 12	2.2 / 4		M		0	2.3
9.8*	15.8	**CLAY** (CL) - Gray, moist, soft w/ shells.	CL								
		Peat lens - Dark brown, moist 13.8-13.9 feet.		F	12 to 14	0.3 / 2		M		---	1.2

Boring / Well No.: CSB-06	Start Date & Time: 8/19/1999 1425	Finish Date & Time : 8/19/1999 1650
Project Name: Clark Refining & Mkt., Inc.	Project No.: 15-99036.10-001	Logged By: K. Comire

DEPTHS		DESCRIPTION	GRAPHICS	SAMPLE INFORMATION							
										PID or FID Measurements / Remarks	
Top	Bottom			I.D.	Interval	Recovery	Method	Moisture	Blow Count	Scan	Headspace
9.8*	15.8	CLAY (CL) - continued. Peat lens - Dark brown, moist, 14.1-14.2 feet. Sheen on water brought to surface w/ 12-16 ft. sampling tube.	CL	G	14 to 16	2 / 2		M / S		—	4.2
15.8	20.0*	SILTY SAND (SM) - Dark gray, saturated, fine w/ trace medium-coarse Sand.	SM	H	16 to 20	1 / 4		S		—	1.3
		END OF BORING AT 20.0 FEET									
		* Estimated depths - Sediments extruded from sampler due to shattered tube.									

Boring / Well No.:	CSB-07	Start Date & Time:	08/24/99 0905	Boring Location / Coordinates:	
Logged By:	K. Comire	Finish Date & Time :	08/24/99 1125		
Project Name:	Clark Refining & Marketing, Inc.	Project No.:	15-99036.10-001	Refer to Site Plan	N
Project Location:	Blue Island, IL				
Drilling Co.:	Clayton Env.	Drilling Equipment:	Hydraulic probe unit		
Driller:	N. Bolivar	Drilling Method:	Direct push		
Ground Elevation:	NA	Top of Casing Elevation:	NA		
Borehole Dia.:	2"	Development Method:	NA		
Outer Casing Dia / Material / Length:			NA		
Inner Casing Dia. / Material / Length:			NA		
Screen Interval / Material / Slot size:			NA		
First Water: 4.0 feet	Static Water:				
Date: 8/24/99	Date:				
Time (hrs):	Time:			Surface Conditions: Gravel	

DEPTHS Top	DEPTHS Bottom	DESCRIPTION	GRAPHICS	SAMPLE INFORMATION I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks Scan	PID or FID Measurements / Remarks Headspace
0	0.2	**GRAVEL**	GRAV								
0.2	3.5	**FILL** - Sand, brown, moist and gravel from 0.2-1.4 feet. Silty Clay - Brown to gray brown w/ black staining, moist, trace fine-coarse Sand. Brick lens from 3.2-3.5 feet. Gravel lens - black stained and clinkers from 2.9-3.2 ft.	FILL	A	0 to 2	1.3 / 2		M		0	0.2
				B	2 to 4	2 / 2		M		0	0.5
3.5	5.5	**SILTY SAND** (SM) - Gray, moist, fine. Clayey Silt (CL-ML) lens - Gray brown, moist from 3.5-3.7 feet. Grades light brown and saturated at approx. 4 feet.	SM	C	4 to 6	1.1 / 2		S		0	0.3
5.5	7.3	**CLAYEY SILT** (CL-ML) - Light gray w/ orange mottles, saturated w/ fine Sand.	CL-ML	D	6 to 8	2 / 2		S / M		0	0.4
7.3	8.0	**SILTY CLAY** (CL) - Gray w/ orange mottles, moist.	CL								
8.0*	9.1*	**SILTY SAND** (SM) - Brown, saturated, fine.	SM	E	8 to 12	1.7 / 4		S / M		0	0.3
9.1*	9.8*	**SILTY CLAY** (CL) - Gray, moist w/ peat.	CL								
9.8*	11.5*	**PEAT** (PT) - Dark brown, moist	PT								
11.5*	18.0	**SILTY CLAY** (CL) - Gray, moist Peat lens - Dark brown, moist from 12.5-12.7 feet. Clay lens - Gray, moist, soft w/ shells from 12.7-13.2 ft. Grades hard w/ trace fine-coarse Sand at 13.2 feet.	CL	F	12 to 14	2 / 2		M		0	0.3

Boring / Well No.: CSB-07	Start Date & Time: 8/24/1999 0905	Finish Date & Time: 8/24/1999 1125
Project Name: Clark Refining & Mkt., Inc.	Project No.: 15-99036.10-001	Logged By: K. Comire

DEPTHS		DESCRIPTION	GRAPHICS	SAMPLE INFORMATION							
										PID or FID Measurements / Remarks	
Top	Bottom			I.D.	Interval	Recovery	Method	Moisture	Blow Count	Scan	Headspace
11.5*	18.0	SILTY CLAY (CL) - continued Clay lens - Gray, moist, soft w/ shells from 14.8-14.9 feet.	CL	G	14 to 16	1.5 / 2		M		0	0.3
				H	16 to 18	1.3 / 2		M		0	0.4
		END OF BORING AT 18.0 FEET									
		* Estimated due to poor recovery.									

Boring / Well No.:	CSB-08	Start Date & Time:	08/24/99 1233
Logged By:	K. Comire	Finish Date & Time:	08/24/99 1437
Project Name:	Clark Refining & Marketing, Inc.	Project No.:	15-99036.10-001
Project Location:	Blue Island, IL		
Drilling Co.:	Clayton Env.	Drilling Equipment:	Hydraulic probe unit
Driller:	N. Bolivar	Drilling Method:	Direct push
Ground Elevation:	NA	Top of Casing Elevation:	NA
Borehole Dia.:	2"	Development Method:	NA
Outer Casing Dia / Material / Length:			NA
Inner Casing Dia. / Material / Length:			NA
Screen Interval / Material / Slot size:			NA
First Water: 4.0 feet	Static Water:		
Date: 8/24/99	Date:		
Time (hrs):	Time:		

Boring Location / Coordinates:

Refer to Site Plan

N

Surface Conditions: Asphalt

DEPTHS Top	DEPTHS Bottom	DESCRIPTION	GRAPHICS	SAMPLE INFORMATION I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks Scan	PID or FID Measurements / Remarks Headspace
0	0.2	**ASPH**ALT	ASPH								
0.2	8.0	**FILL** - Sand, dark brown, moist from 0.2-0.8 feet. Silty clay, dark brown w/ black staining, moist w/ trace fine-coarse Sand, fine Gravel, and Brick.	FILL	A	0 to 2	0.9 / 1.8		— / M		0	0.7
		Grades gray w/ black staining, saturated w/ little fine-coarse Sand at approximately 4.0 feet.		B	2 to 4	2 / 2		M		0	0.4
		Sandy clay lens - saturated from 5.5-5.7 feet.		C	4 to 6	1.6 / 2		S		0	1.0
		Grades gray w/ orange mottles, moist w/ fine Sand, trace roots at approximately 6.0 feet.		D	6 to 8	2 / 2		M		0	1.1
8.0	10.7	**SILTY CLAY** (CL) - Gray, saturated, soft w/ trace roots.	CL	E	8 to 10	1.5 / 2		S		0	1.0
10.7	11.6	**PEAT** (PT) - Dark brown, moist.	PT	F	10 to 12	2 / 2		S / M		0	0.9
11.6	16.0	**CLAY** (CL) - Gray, moist, soft w/ shells.	CL								
		Grades to Silty Clay gray, moist, hard w/ trace fine-coarse Sand and fine-medium Gravel at 12.9 feet.		G	12 to 14	1.8 / 2		M		0	0.9

Boring / Well No.: CSB-08	Start Date & Time: 8/24/1999 1233	Finish Date & Time : 8/24/1999 1437
Project Name: Clark Refining & Mkt., Inc.	Project No.: 15-99036.10-001	Logged By: K. Comire

DEPTHS		DESCRIPTION	GRAPHICS	SAMPLE INFORMATION							
				I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks	
Top	Bottom									Scan	Headspace
11.6	16.0	CLAY (CL) - continued END OF BORING AT 16.0 FEET.	CL	H	14 to 16	1.6 / 2		M		0	0.5

Boring / Well No.:	CSB-09	Start Date & Time:	08/24/99 1446
Logged By:	K. Comire	Finish Date & Time:	08/24/99 1611
Project Name:	Clark Refining & Marketing, Inc.	Project No.:	15-99036.10-001
Project Location:	Blue Island, IL		
Drilling Co.:	Clayton Env.	Drilling Equipment:	Hydraulic probe unit
Driller:	N. Bolivar	Drilling Method:	Direct push
Ground Elevation:	NA	Top of Casing Elevation:	NA
Borehole Dia.:	2"	Development Method:	NA
Outer Casing Dia / Material / Length:			NA
Inner Casing Dia. / Material / Length:			NA
Screen Interval / Material / Slot size:			NA
First Water: 6.0 feet	Static Water:		
Date: 8/24/99	Date:		
Time (hrs):	Time:		

Boring Location / Coordinates:

Refer to Site Plan

N

Surface Conditions: Asphalt

DEPTHS Top	DEPTHS Bottom	DESCRIPTION	GRAPHICS	SAMPLE INFORMATION I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks Scan	PID or FID Measurements / Remarks Headspace
0	0.2	**ASPHALT**	ASPH								
0.2	7.0	**FILL** - Sand, dark brown, moist, fine w/ medium-coarse Sand from 0.2-1.1 feet. Gravel lens - from 0.9-1.1 feet.	FILL	A	0 to 2	1.8 / 1.8		M / M		0	0.6
		Silty Clay - Brown w/ black staining, moist, trace fine-coarse Sand and Brick.		B	2 to 4	0.6 / 2		M		0	0.8
		Grades dark gray w/ black staining at approx. 4.0 feet.		C	4 to 6	2 / 2		M		0	2.0
		Silty Sand - Brown to dark gray w/ black staining, saturated from 6-7 feet.		D	6 to 8	2 / 2		S		0	1.0
7.0	8.0	**SILTY CLAY** (CL) - Gray w/ orange mottles, saturated w/ fine Sand.	CL								
8.0	10.6	**SILTY SAND** (SM) - Gray brown, saturated, fine, w/ trace medium-coarse Sand.	SM	E	8 to 10	1.5 / 2		S		0	0.7
10.6	11.0	**SILTY CLAY** (CL) - Gray, saturated.	CL	F	10 to 12	2 / 2		S / M		0	0.8
11.0	11.6	**PEAT** (PT) - Dark brown, moist.	PT								
11.6	16.0	**CLAY** (CL) - Dark brown, moist, soft, w/ shells and Peat. Grades gray w/ no Peat at 12.3 feet. Grades to Silty Clay, dark gray, moist, hard, w/ trace fine-coarse Sand at 13.6 feet.	CL	G	12 to 14	1.5 / 2		M		0	0.8

Boring / Well No.: CSB-09	Start Date & Time: 8/24/1999 1446	Finish Date & Time : 8/24/1999 1611
Project Name: Clark Refining & Mkt., Inc.	Project No.: 15-99036.10-001	Logged By: K. Comins

DEPTHS		DESCRIPTION	GRAPHICS	SAMPLE INFORMATION							
				I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks	
Top	Bottom									Scan	Headspace
11.6	16.0	CLAY (CL) - continued END OF BORING AT 16.0 FEET	CL	H	14 to 16	2 / 2		M		0	0.6

Boring / Well No.:	CSB-10	Start Date & Time:	08/24/99 1654	Boring Location / Coordinates:	
Logged By:	K. Comire	Finish Date & Time:	08/24/99 1821		
Project Name:	Clark Refining & Marketing, Inc.	Project No.:	15-99036.10-001		
Project Location:	Blue Island, IL			Refer to Site Plan	N
Drilling Co.:	Clayton Env.	Drilling Equipment:	Hydraulic probe unit		
Driller:	N. Bolivar	Drilling Method:	Direct push		
Ground Elevation:	NA	Top of Casing Elevation:	NA		
Borehole Dia.:	2"	Development Method:	NA		
Outer Casing Dia / Material / Length:			NA		
Inner Casing Dia. / Material / Length:			NA		
Screen Interval / Material / Slot size:			NA		
First Water: 5.0' feet		Static Water:			
Date: 8/24/99		Date:			
Time (hrs):		Time:		Surface Conditions: Gravel	

DEPTHS Top	DEPTHS Bottom	DESCRIPTION	GRAPHICS	SAMPLE INFORMATION I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks: Scan	PID or FID Measurements / Remarks: Headspace
0	0.2	**GRAVEL**	GRAV								
0.2	4.6	**FILL** - Sand, dark brown, moist w/ some medium-coarse Sand and trace Gravel from 0.2-2.2 feet. Gravel lens from 1.7-1.9 feet. Brick lens from 2.0-2.2 feet. Silty Clay - Dark gray w/ black staining, moist, w/ some fine Sand and trace medium-coarse Sand from 2.2-4.6 feet.	FILL	A	0 to 2	1.3 / 2		M		0	9.7
				B	2 to 4	2 / 2		M		0	22
4.6	5.1	**SILTY CLAY** (CL) - Dk gr w/ blk stains, moist w/ f. Sand.	CL	C	4 to 6	1.5 / 2		M / S		200	1000
5.1	9.5	**SILTY SAND** (SM) - Gray brown w/ orange mottles, black staining, saturated. Grades gray at 7.2 feet. Trace roots from 8.0-9.5 feet.	SM	D	6 to 8	2 / 2		S		200	880
				E	8 to 10	0.5 / 2		S		20	560
9.5	11.3	**SILTY CLAY** (CL) - Gray, saturated w/ fine sand, trace roots. Sand grades out at 10.7 feet.	CL	F	10 to 12	2 / 2		S / M		100	290
11.3	12.0	**PEAT** (PT) - Dark brown, moist.	PT								
12.0	16.0	**CLAY** (CL) - Gray, moist, soft w/ shells. Grades to Silty Clay, gray, moist, hard w/ trace fine-coarse Sand at 13.5 feet.	CL	G	12 to 14	1.1 / 2		M		4.0	54

Boring / Well No.: CSB-10	Start Date & Time: 8/24/1999 1654	Finish Date & Time : 8/24/1999 1821
Project Name: Clark Refining & Mkt., Inc.	Project No.: 15-99036.10-001	Logged By: K. Comire

DEPTHS		DESCRIPTION	GRAPHICS	SAMPLE INFORMATION							
										PID or FID Measurements / Remarks	
Top	Bottom			I.D.	Interval	Recovery	Method	Moisture	Blow Count	Scan	Headspace
12.0	16.0	CLAY (CL) - continued END OF BORING AT 16.0 FEET	CL	H	14 to 16	1.6 / 2		M		1.0	21
		* Approximately 1/8 inch of free product recovered from open borehole upon completion.									

Boring / Well No.:	CSB-11	Start Date & Time:	08/25/99 0800	Boring Location / Coordinates:	
Logged By:	D. Lombardi	Finish Date & Time:	08/25/99 1045		
Project Name:	Clark Refining & Marketing, Inc.	Project No.:	15-99036.10-001		
Project Location:	Blue Island, IL			Refer to Site Plan	N
Drilling Co.:	Clayton Env.	Drilling Equipment:	Hydraulic probe unit		
Driller:	N. Bolivar	Drilling Method:	Direct push		
Ground Elevation:	NA	Top of Casing Elevation:	NA		
Borehole Dia.:	2"	Development Method:	NA		
Outer Casing Dia / Material / Length:			NA		
Inner Casing Dia. / Material / Length:			NA		
Screen Interval / Material / Slot size:			NA		
First Water: 8.0 feet		Static Water:			
Date: 8/25/99		Date:			
Time (hrs):		Time:		Surface Conditions: Asphalt / Gravel	

DEPTHS Top	DEPTHS Bottom	DESCRIPTION	GRAPHICS	SAMPLE INFORMATION I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks Scan	Headspace
0	0.8	**FILL** - Gravelly to Clayey Silt, brown, slightly moist.	FILL	A	0 to 4	3.7		M		0-30	40-70
0.8	4.0	**FILL** - Silty to Clayey Sand, mottled brown to light brown, moist, slight odor at 2-4 feet, soft, fine sand, very moist. Petroleum odor at 2.5 feet.	FILL			4					500-800
4.0	5.6	**CLAYEY SAND** (SC) - Mottled, light brown to brown, moist, soft, fill, petroleum odor.	SC	B	4 to 8	3.7		M		2-10	200-800
5.6	6.4	**SILTY SAND** (SM) - Sat., f. Sand, lt brown, some Clay. Grades to Clayey Sand, saturated, light brown, soft.	SM					S			300-500
6.4	8.0	**SILT** to **CLAYEY SILT** (ML) - Moist, trace fine Sand, soft, wet towards 8.0 feet. Grades to silt at 7.5-8.0 feet, black-orange stringers throughout, wet.	ML			4		M			40-120
8.0	8.5	**SILTY SAND** (SM) - Light brown, fine Sand, saturated.	SM	C	8 to 12	4		S		2	300
8.5	10.6	**SILTY CLAY** (CL) - Light brown gray, soft, moist to very moist, trace fine Sand.	CL					VM			10
10.6	11.9	**PEAT** (PT) - Dark brown w/ Clay and Silt, moist.	PT			4		M			5-10
11.9	12.0	**CLAYEY SILT** (ML) - Lt. gray, mo., soft, w/ shell frags.	ML								
12.0	19.6	**SILTY CLAY** (CL) - Dark gray, moist, stiff, trace fine Gravel and fine Sand.	CL	D	12 to 14	1.8 2		M		2	30

Boring / Well No.: CSB-11	Start Date & Time: 08/25/99 0800	Finish Date & Time : 08/25/99 1045
Project Name: Clark Refining & Mkt., Inc.	Project No.: 15-99036.10-001	Logged By: D. Lombardi

DEPTHS		DESCRIPTION	GRAPHICS	SAMPLE INFORMATION							
										PID or FID Measurements / Remarks	
Top	Bottom			I.D.	Interval	Recovery	Method	Moisture	Blow Count	Scan	Headspace
12.0	19.6	SILTY CLAY (CL) - continued Some organic nodules at 14-16 feet. Organic seam at 15.6 feet and medium gravel seen at 16 feet. Medium brown to gray at 16 feet, hard, fine-medium gravel, shale clasts, slightly moist to moist. PID reading registered, but may have occurred due to muddy water in sampling tube. Shale and limestone clasts at 18-19.6 feet.	CL	E	14 to 16	2 / 2		SM		0	5
				F	16 to 18	1.8 / 2		M		10.2	10-30
				G	18 to 20	2 / 2		SM		0	1.0
19.6	20.7	SILT (ML) - Light gray w/ slight olive hue, some medium-coarse Gravel, slightly moist. Gravelly Silt at 20 feet - Light gray, medium-coarse Gravel (limestone), weathered bedrock zone. END OF BORING AT 20.7 FEET	ML	H	20 to 20.7	0.7 / 0.7		SM		0	1.5

Boring / Well No.:	CSB-12	Start Date & Time:	08/25/99 1155
Logged By:	D. Lombardi	Finish Date & Time :	08/25/99 1552
Project Name:	Clark Refining & Marketing, Inc.	Project No.:	15-99036.10-001
Project Location:	Blue Island, IL		
Drilling Co.:	Clayton Env.	Drilling Equipment:	Hydraulic probe unit
Driller:	N. Bolivar	Drilling Method:	Direct push
Ground Elevation:	NA	Top of Casing Elevation:	NA
Borehole Dia.:	2"	Development Method:	NA
Outer Casing Dia / Material / Length:		NA	
Inner Casing Dia. / Material / Length:		NA	
Screen Interval / Material / Slot size:		NA	
First Water: 5.1 feet	Static Water:		
Date: 8/25/99	Date:		
Time (hrs):	Time:		

Boring Location / Coordinates:

Refer to Site Plan

N

Surface Conditions: Wet Surface Soil

DEPTHS Top	DEPTHS Bottom	DESCRIPTION	GRAPHICS	SAMPLE INFORMATION I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks: Scan	PID or FID Measurements / Remarks: Headspace
0	1.9	**FILL** - Silty Clay light brown to dark brown, mottled, soft, trace Gravel, slightly moist to moist, faint humic odor.	FILL	A	0 to 4	4		M		—	0
1.9	5.1	**SILTY to SANDY CLAY** (CL) - Mottled black and light brown, mostly black, petroleum odors, trace fine Gravel, moist, odors from black zones.	CL			4					
5.1	10.0	**SILTY SAND** (SM) - Light brown, some Clay, saturated, fine-medium grained. No sheen or odors at 6.0-6.8 feet. Some Clay w/ Clay stringers, less silty at 8.0 feet. No sheen or odors at 6.8-8.0 feet. Sandy at 8.0-9.4 feet - light brown, saturated, fine-medium grained, trace coarse grained. Grades to light gray Silty Sand at 9.4 feet, trace Clay, medium-fine, some coarse Sand.	SM	B	4 to 8	4		M S		—	0
						4		S			
				C	8 to 12	4		S		—	0
10.0	10.7	**SAND** (SP) - Light gray, fine-medium, saturated, trace silt, some root frags, grades to SM at 10.5-10.7 feet.	SP			4					
10.7	11.4	**SILTY SAND** (SM) - Lt gray, tr CL, sat, f-m, tr. root frags.	SM					M			
11.4	13.0	**SILTY CLAY** (CL) - Lt gr, mo, v. soft, Clayey, organic stringers 11.8-12 ft, grades dk brn at 12 ft. ClSt to SiCl, PT zn, dk brn, s. mo, grades ClSt, w/ shell frag zn 12.7-13 ft.	CL	D	12 to 14	1.5 2		M		—	0
13.0	13.5	**CLAYEY SILT** - Lt gr, less shells, moist, Clayey.	ML								
13.5	14.3	**SILTY SAND** (SM) - Lt gray to gr brn, moist, f-m grained.	SM								

Boring / Well No.: CSB-12	Start Date & Time: 8/25/1999 1155	Finish Date & Time : 8/25/1999 1552
Project Name: Clark Refining & Mkt., Inc.	Project No.: 15-99036.10-001	Logged By: D. Lombardi

DEPTHS		DESCRIPTION	GRAPHICS	SAMPLE INFORMATION							
Top	Bottom			I.D.	Interval	Recovery	Method	Moisture	Blow Count	PID or FID Measurements / Remarks: Scan	PID or FID Measurements / Remarks: Headspace
13.5	14.3	Poor Recovery - Silty Sand at 14.2-14.3 feet.	SM								
14.3	16.0	CLAYEY SILT (CL) - Light gray, moist, w/ shells and shell fragments, crumbly and soft. Grades to Silty Clay (CL) towards 16.0 feet.	CL	E	14 to 16	1.8 / 2		M		—	0
16.0	16.5	NO RECOVERY									
16.5	16.9	SILTY CLAY (CL) - Med gr, very soft, plastic, moist w/ shell frags.	CL	F	16 to 18	1.5 / 2		M		—	0
16.9	21.8	SILTY CLAY (CL) - Till, gray-dark gray, moist, some fine-medium gravel, hard. Dark gray, moist, hard, some fine-medium gravel at 18-20 feet. Moist, hard, trace medium-coarse gravel at 20.0 to 21.8 feet.	CL	G	18 to 20	2 / 2		M		—	0
				H	20 to 22	1.7 / 2		M		—	0
21.8	24.7	SILT (ML) - Light gray, soft, moist. Very moist to saturated at 22-24 feet, laminated at 24 feet, crumbly.	ML	I	22 to 24	1.7 / 2		M / S		—	0
				J	24 to 26	1.7 / 2		S / M		—	0
24.7	28.0	SILTY CLAY (CL) - Till, dark gray, hard, fine-medium Gravel, moist.	CL	K	26 to 28	2 / 2		M		—	0
28.0	28.5	GRAVELLY SILT to SILT (ML) - Light gray, saturated, very coarse limestone fragments, clasts angular, Silt matrix at base of sample. REFUSAL AT 28.5 FEET	ML	L	28 to 28.5	0.5 / 0.5		S		—	0

A.T. KEARNEY

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222 West Adams Street
Chicago, Illinois 60606
312 648 0111
312 223 6200 Fax

RZ2.R05020.01.ID.152

August 26, 1997

Mr. Brian Freeman
US Environmental Protection Agency
Region 5 DRE-8J
77 West Jackson Boulevard
Chicago, IL 60604

Reference: EPA Contract No. 68-W4-0006; Work Assignment No. R05020; Clark Refining and Marketing, Inc.; Blue Island, Illinois; EPA ID No. ILD005109822; Trip and Analytical Results Report; Task 06 Deliverable

Dear Mr. Freeman:

Please find enclosed A.T. Kearney's Trip and Analytical Results Report for the Clark Refining and Marketing, Inc. (Clark) facility in Blue Island, Illinois. This report summarizes visual observations and sample analyses resulting from site visit and sampling event that was conducted at the facility on July 28, 1997. The samples were analyzed by the Intertek Testing Services in Richardson, Texas. A.T. Kearney performed data validation on the resulting laboratory data package. Please note, the complete data package will be submitted under separate cover.

Please feel free to contact me at (312) 345-8963 or Mr. Robert Young, the A.T. Kearney Technical Lead at (312) 345-8966 if you have any questions.

Sincerely,

Patricia Brown Derocher

Patricia Brown-Derocher
Regional Manager

cc: F. Norling, EPA Region 5 (w/out attachment)
A. Wojtas, EPA Region 5
B. Jordan
R. Young
A. Williams

CLARK OIL REFINING
EPA ID NO. ILD005109822
TRIP AND ANALYTICAL RESULTS REPORT

Submitted to:

Mr. Brian Freeman
U.S. Environmental Protection Agency
RCRA Enforcement Branch
Region 5 DRE-8J
77 West Jackson Boulevard
Chicago, Illinois 60604

Submitted by:

A.T. Kearney, Inc.
222 West Adams Street
Chicago, Illinois 60606

EPA Work Assignment No.	**R05020**
Contract No.	**68-W4-0006**
Kearney WAM	**Patricia Brown-Derocher**
Telephone No.	**312/345-8963**
EPA WAM	**Brian Freeman**
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August 26, 1997

CLARK REFINING AND MARKETING, INC.
EPA ID NO. ILD005109822
TRIP AND ANALYTICAL RESULTS REPORT

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Tables

Appendices

1.0 Summary of Field Activities

A sampling inspection was conducted by Mr. Robert Young and Mr. John Koehnen of A.T. Kearney, Inc. on July 28, 1997 at the Clark Refining and Marketing, Inc. (Clark) facility in Blue Island, Illinois (EPA ID No. ILD005109822). In addition, the following personnel were involved, either at the Clark site, in preliminary meetings, or via telephone, at various times during sampling activities:

Mr. Brian Freeman - U.S. EPA Work Assignment Manager
Mr. Allen Wojtas - U.S. EPA Technical Lead
Ms. Margo Dusenbury - U.S. EPA National Enforcement Investigations Center (NEIC)
Mr. Dave Beener - Clark Oil Refinery
Mr. Jerry Fields - Clark Oil Refinery

This report describes the significant elements of the sampling visit at the Clark facility in Blue Island, Illinois. The actual sampling activities were conducted by the A.T. Kearney field personnel, under the direction of Mr. Brian Freeman, U.S. EPA Work Assignment Manager (EWAM). The purpose of the sampling visit was to collect supplemental samples from key areas which were noted during a large-scale sampling effort previously performed by U.S. EPA. The environmental samples collected were analyzed for Toxicity Characteristic Leachate Procedure (TCLP) Volatile Organic Compounds (VOCs) and TCLP metals. The associated quality control (QC) samples were prepared and analyzed for total VOCs and total metals, with the exception of the duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples which were analyzed for TCLP VOCs and TCLP metals along with the environmental samples.

2.0 Summary of Sample Collection Activities

The sample collection procedures proposed for the Clark facility sampling inspection, as documented in the procedures outlined in the Site-Specific Sampling and Analysis Plan (SAP) submitted to U.S. EPA on July 24, 1997, were followed, with the exceptions described below. Only disposable sampling equipment was used, and all equipment was decontaminated prior to the site visit, in accordance with the SAP. Used sampling and safety equipment were accepted by Clark representatives for disposal, therefore no post-inspection decontamination was required.

Samples were collected from several different areas of the facility, as outlined in the SAP. At the request of facility representatives, A.T. Kearney field representatives provided Clark with a split sample at each sampling location. Per the direction of the EWAM, A.T. Kearney field personnel provided the Clark representatives with pre-cleaned containers for the split samples. Sample locations are summarized in Table 1 and procedures used to collect samples are described below. Photographs referenced in the descriptions are contained in Appendix A of this report.

Tank 59 (Photographs 1 through 4) - In accordance with the SAP, three liquid samples (TK-59-1, TK-59-3 and OP-1) were collected in the vicinity of Tank 59. Duplicate samples TK-59-2 and OP-2 were collected at locations TK-59-1 and OP-1, respectively. The sampling locations, times and parameters analyzed are summarized in Table 1.

TK-59-1 and TK-59-2 were collected from a valve in the influent line, directly adjacent to the tank. The samples were collected by allowing the wastewater to flow directly into the sample containers. TK-59-3 was collected from a sump-like depression located approximately 20 feet east of Tank 59 (see Photograph 2 in Appendix A). The sump-like feature measured approximately six by six feet and contained a dark, oily liquid that appeared to be at least one foot deep. It also appeared that the depressed area was unlined, and had been dug into the containment area of Tank 59 to collect overland surface flow. Clark representatives were not aware of when the sump-like feature was dug, or the purpose of the unit. It should be noted that the unit sampled was not the "Tank 59 Sump" shown on facility drawings (the "Tank 59 Sump" is located northeast of the tank, and in the background of Photograph 2). TK-59-3 was collected by dipping a pre-cleaned beaker into the "sump" and pouring the liquid into the sample containers. The beaker was re-filled between containers since the liquid immediately separated into phases upon collection.

OP-1 and OP-2 were collected from the overflow pit located to the west of Tank 59. The pit contained what appeared to be several feet of a dark, oily liquid which extended to about four feet below the top of the unit's concrete walls. The material was collected by dipping a pre-cleaned beaker, attached to an extension pole, into the pit and pouring the liquid into the sample containers.

Tank 55 (Photographs 5 through 7) - In accordance with the SAP, one solid sample (TK-55-1) and one liquid sample (TK-55-3) were collected from the area directly beneath the iron pipe that discharges into the Tank 55 dike. The iron pipe was located south of Tank 55, along the southern containment berm. Duplicate sample TK-55-2 was collected at the TK-55-1 location.

The base of the containment area surrounding Tank 55 contained a thin layer of fresh gravel. However, it was apparent that several inches of the base material beneath the gravel was saturated with a petroleum-like product, as the sampling team sank in the material when walking in the containment area. Also, floating product was apparent on the surface of water that was pooled in the Tank 55 containment area.

Clark representatives indicated that petroleum-contaminated soil and gravel material had been recently excavated from the northern portion of the Tank 55 containment area. The contaminated material was placed in two large roll-off boxes, which were situated to the north of Tank 55. The roll-off boxes are shown in Photograph 7 in Appendix A.

TK-55-1, TK-55-2 and TK-55-3 were collected from an area where water had pooled beneath the iron pipe leading into the Tank 55 containment berm (Photograph 5). The water contained a floating product and a black, solid residue along the edges of the pool. TK-55-1 and the duplicate sample, TK-55-2 were collected by placing the black residue directly into the sample containers using a pre-cleaned stainless steel spoon. The residue formed a very thin layer around the pooled water, and there was not enough volume to allow for homogenization of the TCLP metals portion of the sample. Therefore, neither the TCLP VOC, or metals sample material were homogenized prior to filling the sample containers.

TK-55-3 was collected by dipping a pre-cleaned beaker into the pooled water/floating material and pouring the liquid into the sample containers. The beaker was re-filled between containers because the liquid immediately separated into phases upon collection.

Tanks 322 and 323 (Photograph 10) - In accordance with the SAP, one liquid sample (TK-322-1) was collected from the oily liquid present in the containment area surrounding Tanks 322 and 323. The sample was collected along the western berm, near Tank 322. As shown in Photograph 10 in Appendix A, oily liquid was present on the surface in several areas of the containment area surrounding the tanks.

TK-322-1 was collected by dipping a pre-cleaned beaker into the liquid in the containment area, and pouring the liquid into the sample containers. The beaker was re-filled between containers because the liquid immediately separated into phases upon collection.

Tank 29 (Photograph 11) - In accordance with the SAP, one liquid sample (TK-29-B1) was collected from the liquid present in the containment area along the east side of Tank 29. The sample was collected from below the valve at the eastern perimeter of the tank.

TK-29-B1 was collected by dipping a pre-cleaned beaker into the liquid in the containment area, and pouring the liquid into the sample containers. The samples were all collected from one beaker volume.

The collection of waste samples from the valves near the bottom of Tanks 28 and 29 was also proposed in the SAP. However, Clark representatives indicated that the valves had not been opened for several years, and were, therefore, hesitant to open the valves for sampling. In order

to avoid a potential major release, the A.T. Kearney field personnel Team did not attempt to sample at the valves. Clark representatives did indicate that the tanks could be sampled from the top using a bottle messenger-type sampler. However, the representatives also indicated that Tanks 28 and 29 manage spent caustic material with a pH of approximately 13-14, and these materials are sold to other companies as product. Therefore, the liquid material within Tanks 28 and 29 were not sampled during the site visit.

Junction Box 38 Sump (Photograph 12) - In accordance with the SAP, one liquid sample (S-38-1) was collected from the liquid present in the Junction Box 38 Sump. S-38-1 was collected by extending a pre-cleaned beaker into the sump and collecting the liquid pooled in the unit. The samples were all collected from two beaker volumes.

The SAP indicated that the sump would be visually inspected to locate potentially spilled petroleum product. However, the sump was covered by a large metal cover which could not be moved. Therefore, the material inside the sump could not be readily viewed or accessed. As previously indicated, sample S-38-1 was collected by extending a beaker through an access point in the metal cover, down into the liquid pooled at the base of the sump.

Desalter Tank (Photographs 8 and 9) - In accordance with the SAP, three liquid samples (DES-1, DES-2 and DES-3) were collected from the sampling taps at the Desalter Tank. DES-1 was collected from the wastewater portion of the tank. DES-2 was collected from the emulsion ("rag") layer, and DES-3 was collected from the oil portion of the tank.

Each of the waste streams at the Desalter Tank arrived at the sampling taps in a heated condition, reportedly at temperatures greater than 120°F. Due to the heated nature of the samples, the sampling team could not immediately handle the samples. Therefore, each of the samples at the Desalter Tank were collected using a beaker, which was allowed to fill with the wastestream, at the sampling tap. After the beaker was filled, the liquid was poured into sample containers (40-ml vials) housed within a foam-cushioned shipping package. The vials were capped using the foam material as an insulator, then placed into the sample cooler.

Quality Control Samples - Two trip blanks were placed into the sample coolers used to manage the samples collected, prior to the collection of the first sample. The trip blanks (TB-1 and TB-2) accompanied the investigative samples throughout the entire sampling event.

One field blank (FB-1) was collected in the refinery portion of the Clark facility, near Tanks 322 and 323, and the Desalter Tank. FB-1 was collected by directly filling sample containers with deionized/analyte-free water obtained from the laboratory. The VOCs portion of the field blank was preserved with HCL and the metals portion of the sample was preserved with HNO_3.

In accordance with the SAP, three field duplicates were collected based on the variable matrices sampled during the site visit. In addition, as indicated in Table 1, additional sample volume was collected at three locations for matrix spike/matrix spike duplicate analysis.

Sample Handling/Management - Once the samples were collected, all samples were handled,

managed and shipped in accordance with the requirements of the SAP. Investigative samples were not preserved since they were wastes. Samples OP-1, OP-2, TK-59-3, DES-2, DES-3, TK-322-1, TK-29-B1 and TB-2 were shipped overnight as dangerous goods, while the remaining samples were shipped in a cooler as environmental samples. All sample arrived at the laboratory intact, and custody was documented throughout the collection and shipment activities.

TABLE 1
SAMPLE LOCATION SUMMARY

A.T. Kearney/Lab* Sample Identification	Sample Type and Location	Date/Time of Collection	Analytes/Comments
TK-59-1	Liquid - Tank 59 Influent	7/28/97 - 1000	TCLP VOCs / TCLP Metals w/ MS/MSD
TK-59-2	Liquid - Tank 59 Influent	7/28/97 - 1000	TCLP VOCs / TCLP Metals - Dup of TK-59-1
TK-59-3	Liquid - On Ground at T-59	7/28/97 - 1020	TCLP VOCs / TCLP Metals w/ MS/MSD
OP-1	Liquid - Overflow Pit	7/28/97 - 1115	TCLP VOCs
OP-2	Liquid - Overflow Pit	7/28/97 - 1115	TCLP VOCs - Dup of OP-1
TK-55-1	Solid - Stain area at T-55	7/28/97 - 1245	TCLP VOCs / TCLP Metals w/ MS/MSD
TK-55-2	Solid - Stain area at T-55	7/28/97 - 1245	TCLP VOCs / TCLP Metals - Dup of TK-55-1
TK-55-3	Liquid - On Ground at T-55	7/28/97 - 1220	TCLP VOCs / TCLP Metals
DES-1	Liquid - Desalter Wastewater	7/28/97 - 1400	TCLP VOCs
DES-2	Liquid - Desalter Emulsion (Rag) Layer	7/28/97 - 1415	TCLP VOCs
DES-3	Liquid - Desalter Oil	7/28/97 - 1425	TCLP VOCs
TK-322-1	Liquid - On Ground at T-322	7/28/97 - 1445	TCLP VOCs
TK-29-B1	Liquid - On Ground at T-29	7/28/97 - 1515	TCLP VOCs
S-38-1	Liquid - From Sump 38	7/28/97 - 1605	TCLP VOCs
TB-1	Trip Blank #1	7/28/97	Total VOCs
TB-2	Trip Blank #2	7/28/97	Total VOCs
FB-1	Field Blank	7/28/97 - 1310	Total VOCs/Metals

* A.T. Kearney and Laboratory sample designations are identical

3.0 Summary of Analytical Results

Samples were analyzed using the Toxicity Characteristic Leachate Procedure (TCLP) for VOCs and metals. The samples were analyzed by the Intertek Testing Services (ITS) Laboratory in Richardson, Texas, as specified in the A.T. Kearney SAP. Per Region 5 guidelines, the data were validated using the *U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review.* The correlation between the A.T. Kearney sample designations and the locations and analytes is provided in Table 1. Tables 2, 3 and 4 present the analytical results for the samples.

Tank 59 - The wastewater influent sampled at Tank 59 (TK-59-1 and the duplicate, TK-59-2) contained benzene at concentrations of 4.90 mg/l and 4.70 mg/l. These concentrations exceed the regulatory limit of 0.5 mg/l specified in Table 1 of 40 CFR 261.24. All other organic compounds were below detection limits and the regulatory limits in Table 1 of 40 CFR 261.24. All metals were below detection limits or were detected at concentrations below the regulatory limits specified in Table 1 of 40 CFR 261.24.

The oily liquid present in the "sump-like" area east of Tank 59 (TK-59-3) did not contain any VOCs at concentrations exceeding detection limits which were all below the regulatory limits specified in Table 1 of 40 CFR 261.24. All metals were below detection limits or were detected at concentrations below the regulatory limits specified in Table 1 of 40 CFR 261.24.

The oily liquid in the overflow pit (OP-1) contained benzene (104 mg/l), chlorobenzene (1.2 mg/l) and 1,2-dichloroethane (2.5 mg/l). The duplicate sample of the liquid (OP-2) contained benzene (79 mg/l), chlorobenzene (0.4 mg/l), chloroform (0.85 mg/L) and 1,2-dichloroethane (1.30 mg/l). The concentrations of benzene and 1,2-dichloroethane in the investigative and duplicate samples exceed the regulatory limits specified in Table 1 of 40 CFR 261.24.

Tank 55 - The black residue material collected along the edge of the pooled liquid in the Tank 55 containment area (TK-55-1) did not contain any VOCs at concentrations exceeding detection limits which were all below the regulatory limits specified in Table 1 of 40 CFR 261.24. All metals were below detection limits or were detected at concentrations below the regulatory limits specified in Table 1 of 40 CFR 261.24. In addition, the duplicate sample (TK-55-2) did not contain any VOCs at concentrations exceeding detection limits or regulatory limits specified in Table 1 of 40 CFR 261.24, and all metals were below detection limits or were detected at concentrations below the regulatory limits specified in Table 1 of 40 CFR 261.24.

The liquid collected from the pooled spill material liquid in the Tank 55 containment area (TK-55-3) contained benzene at a concentration of 0.14 mg/L. This concentration is below the regulatory limit specified in Table 1 of 40 CFR 261.24 for benzene. No other VOCs were detected, and detection limits were below the regulatory limits specified in Table 1 of 40 CFR 261.24. All metals at TK-55-3 were below detection limits or were detected at concentrations below the regulatory limits specified in Table 1 of 40 CFR 261.24.

Tanks 322 and 323 - The sample collected from the oily liquid pooled in the containment area of Tanks 322 and 323 (TK-322-1) did not contain any VOCs at concentrations exceeding detection limits which were all below the regulatory limits specified in Table 1 of 40 CFR 261.24.

Tank 29 - The sample collected from the liquid pooled in the containment area of Tank 29 (TK-29-B1) contained benzene at a concentration of 1.10 mg/L, which exceeds the regulatory limit specified in Table 1 of 40 CFR 261.24. No other VOCs were detected, and detection limits were below the regulatory limits specified in Table 1 of 40 CFR 261.24.

Junction Box 38 Sump - The liquid sample (S-38-1) collected from the Junction Box 38 Sump contained benzene at a concentration of 0.38 mg/L. This concentration is less than the regulatory limit for benzene, as specified in Table 1 of 40 CFR 261.24. No other VOCs were detected, and detection limits were below the regulatory limits specified in Table 1 of 40 CFR 261.24.

Desalter Tank - The wastewater sample collected from the Desalter Tank (DES-1) contained benzene at a concentration of 6.6 mg/L, which exceeds the regulatory limit specified in Table 1 of 40 CFR 261.24. No other VOCs were detected, and detection limits were below the regulatory limits specified in Table 1 of 40 CFR 261.24.

The sample collected from the emulsion ("rag") layer within the tank (DES-2) contained benzene at a concentration of 3.60 mg/L, which exceeds the regulatory limit specified in Table 1 of 40 CFR 261.24. No other VOCs were detected, and detection limits were below the regulatory limits specified in Table 1 of 40 CFR 261.24.

The sample collected from the oil stream within the Desalter Tank (DES-3) contained benzene (1,490 mg/l), chlorobenzene (62 mg/l), 1,2-dichloroethane (25 mg/l) and methyl ethyl ketone (305 mg/l). The concentrations of benzene, 2-dichloroethane and methyl ethyl ketone exceed the regulatory limits specified in Table 1 of 40 CFR 261.24. In addition, due to matrix interference effects, although not detected by the laboratory, quantitation limits for carbon tetrachloride, 1,1-dichloroethene, tetrachlorethene, trichloroethene and vinyl chloride exceeded the regulatory limits specified in Table 1 of 40 CFR 261.24.

Quality Control Samples - No VOCs were detected in either of the trip blanks (TB-1 and TB-2) collected during the sampling inspection. Methylene chloride was detected at 6.4 ug/l in the field blank (FB-1). No other VOCs were detected in FB-1. Methylene chloride is a common laboratory artifact, but not a TCLP target compound. Therefore, no action was required.

A.) Arsenic and selenium were detected in FB- 1 and the prep blank. Arsenic was not detected in any field samples so no qualifies were needed. The reported selenium concentrations were greater than five times the highest blank concentration in all fields samples except TK-55-3, for which the selenium result was qualified as a non-detect. However, all reported selenium results are below the regulatory limit specified in Table 1 of 40 CFR 261.24, so there is no known impact on the useability of the data.

TABLE 2
VOLATILE ORGANIC ANALYTICAL BLANK DATA (Page 1 of 2)

A.T. Kearney Sample Number	**TB-1**	**TB-2**	**FB-1**
Remarks	Trip Blank	Trip Blank	Field Blank
Matrix	D.I. Water	D.I. Water	D.I. Water
Volatile Organic Compounds	**ug/l**	**ug/l**	**ug/l**
Chloromethane	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U
Vinyl chloride	2 U	2 U	2 U
Chloroethane	10 U	10 U	10 U
Methylene chloride	5 U	5 U	**6.4**
Acetone	100 U	100 U	100 U
Carbon disulfide	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U
1,1-Dichloroethane	5 U	5 U	5 U
cis-1,2-Dichloroethene	5 U	5 U	5 U
trans-1,2-Dichloroethene	5 U	5 U	5 U
Chloroform	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U
2-Butanone	50 U	50 U	50 U
1,1,1-Trichloroethane	5 U	5 U	5 U
Carbon tetrachloride	5 U	5 U	5 U
Vinyl acetate	50 U	50 U	50 U
Bromodichloromethane	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U
cis-1,3-Dichloropropene	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U
Chlorodibromomethane	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U
Benzene	5 U	5 U	5 U

TABLE 2
VOLATILE ORGANIC ANALYTICAL BLANK DATA (Page 2 of 2)

A.T. Kearney Sample Number	TB-1	TB-2	FB-1
Remarks	Trip Blank	Trip Blank	Trip Blank
Matrix	D.I.water	D.I. water	D.I.water
Volatile Organic Compounds	**ug/l**	**ug/l**	**ug/l**
trans-1,3-Dichloropropane	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U
2-Chloroethylvinyl ether	10 U	10 U	10 U
4-Methyl-2-pentanone	50 U	50 U	50 U
2-Hexanone	50 U	50 U	50 U
Tetrachloroethene	5 U	5 U	5 U
Toluene	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U
Styrene	5 U	5 U	5 U
o-Xylene	5 U	5 U	5 U
m,p-Xylene	5 U	5 U	5 U

TABLE 3
TCLP VOLATILE ORGANIC ANALYTICAL DATA SUMMARY (Page 1 of 2)

A.T. Kearney Sample Number	**OP-1**	**OP-2**	**TK-29-B1**	**TK-55-1**	**TK-55-2**	**TK-55-3**	**TK-59-1**
Remarks	Diluted 1:100	Diluted 1:50	Diluted 1:50	Diluted 1:20	Diluted 1:20	Diluted 1:20	Diluted 1:20
Matrix	Waste	Waste	Waste	Waste	Waste	Waste	Waste
TCLP Volatile Organic Compounds	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**
Benzene	**104***	**79***	**1.1**	0.10 U	0.10 U	**0.14**	**4.9**
Carbon tetrachloride	0.5 U	0.25 U	0.25 U	0.10 U	0.10 U	0.10 U	0.10 U
Chlorobenzene	**1.2**	**0.40**	0.25 U	0.10 U	0.10 U	0.10 U	0.10 U
Chloroform	0.5 U	**0.85**	0.25 U	0.10 U	0.10 U	0.10 U	0.10 U
1,2-Dichloroethane	**2.5**	**1.30**	0.25 U	0.10 U	0.10 U	0.10 U	0.10 U
1,1-Dichloroethene	0.5 U	0.25 U	0.25 U	0.10 U	0.10 U	0.10 U	0.10 U
Methyl ethyl ketone	5.0 U	2.5 U	2.5 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	0.5 U	0.25 U	0.25 U	0.10 U	0.10 U	0.10 U	0.10 U
Trichloroethene	0.5 U	0.25 U	0.25 U	0.10 U	0.10 U	0.10 U	0.10 U
Vinyl chloride	0.5 U	0.25 U	0.25 U	0.10 U	0.10 U	0.10 U	0.10 U

* Sample diluted at 1:1000 for benzene analysis

TABLE 3
TCLP VOLATILE ORGANIC ANALYTICAL DATA SUMMARY (Page 2 of 2)

A.T. Kearney Sample Number	TK-59-2	TK-59-3	TK-322-1	DES-1	DES-2	DES-3	S38-1
Remarks	Diluted 1:20	Diluted 1:20	Diluted 1:20	Diluted 1:20	Diluted 1:50	Diluted 1:1000	Diluted 1:20
Matrix	waste	waste	waste	waste	waste	waste	waste
TCLP Volatile Organic Compounds	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Benzene	**4.7**	0.10 U	0.10 U	**6.6***	**3.6**	**1490****	**0.38**
Carbon tetrachloride	0.10 U	0.10 U	0.10 U	0.10 U	0.25 U	5.0 U	0.10 U
Chlorobenzene	0.10 U	0.10 U	0.10 U	0.10 U	0.25 U	**62**	0.10 U
Chloroform	0.10 U	0.10 U	0.10 U	0.10 U	0.25 U	5.0 U	0.10 U
1,2-Dichloroethane	0.10 U	0.10 U	0.10 U	0.10 U	0.25 U	**25**	0.10 U
1,1-Dichloroethene	0.10 U	0.10 U	0.10 U	0.10 U	0.25 U	5.0 U	0.10 U
Methyl ethyl ketone	1.0 U	1.0 U	1.0 U	1.0 U	2.5 U	**305****	1.0 U
Tetrachloroethene	0.10 U	0.10 U	0.10 U	0.10 U	0.25 U	5.0 U	0.10 U
Trichloroethene	0.10 U	0.10 U	0.10 U	0.10 U	0.25 U	5.0 U	0.10 U
Vinyl chloride	0.10 U	0.10 U	0.10 U	0.10 U	0.25 U	5.0 U	0.10 U

*Sample diluted at 1:100 for Benzene analysis
**Sample diluted at 1:5000 for Benzene and Methyl ethyl ketone analysis

TABLE 4
INORGANIC ANALYTICAL RESULTS SUMMARY

A.T. Kearney Sample Number	FB-1	TK-55-1	TK-55-2	TK-55-3	TK-59-1	TK-59-2	TK-59-3
Remarks	Field Blank*						
Matrix	D.I. Water	Waste	Waste	Waste	Waste	Waste	Waste
TCLP Metals	**ug/l**	**ug/l**	**ug/l**	**ug/l**	**ug/l**	**ug/l**	**ug/l**
Arsenic	**1.6**	50 U	50 U	50 U	50 U	50 U	50 U
Barium	3.0 U	**491**	**385**	100 U	**107**	**119**	100 U
Cadmium	1.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Chromium	2.0 U	**74.7**	**9.7**	5.0 U	5.0 U	**6.6**	**9**
Lead	50 U	**59.1**	50 U	50 U	50 U	50 U	50 U
Mercury	0.10 U	**0.61**	0.50 U	0.50 U	0.50 U	**4.8**	0.50 U
Selenium	**3.6**	**20.2**	**20.0**	10.7 U	**57.2**	**57.5**	**18.2**
Silver	2.0 U	**7.7**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

*Analyzed for Total Metals

APPENDIX A

PHOTOGRAPHIC LOG

Photo No.: 1
Date: 07/28/97

Time: 1047
Direction: WNW

Description: Close view of sample location TK-59-1 at Tank 59. Note the spigot at the base of the piping, which was used to collect waste sample (TK-59-1) and duplicate sample (TK-59-2), directly into sampling containers. Tank 59 is a wastewater storage tank located in the southeast portion of the facility.

Photo No.: 2
Date: 07/28/97

Time: 1048
Direction: NW

Description: View of sample location TK-59-3, east of Tank 59. TK-59-3 was collected from the sump-like pool in the foreground of the photograph. The "Tank 59 Sump" denoted in the facility diagrams is shown in the background portion of the photograph.

Photo No.: 3
Date: 07/28/97

Time: 1130
Direction: NW

Description: View of the Overflow Pit, where samples OP-1 and OP-2 were collected. The samples were collected using an extension pole and sampling beaker, along the concrete wall on the right side of the photograph.

Photo No.: 4
Date: 07/28/97

Time: 1130
Direction: WNW

Description: Expanded view of Overflow Pit contents. Note the heavy, black oily material within this unit.

Photo No.: 5
Date: 07/28/97

Time: 1215
Direction: W

Description: View of liquid/spill area located within the containment area associated with Tank 55. Samples TK-55-1, TK-55-2 and TK-55-3 were collected from the pooled liquid and black residue shown on the left side of the photograph.

Photo No.: 6
Date: 07/28/97

Time: 1215
Direction: E

Description: Close view of a liquid/spill area located within the containment area associated with Tank 55. This area is approximately 30-40 feet east of the area where TK-55-1, TK-55-2 and TK-55-3 were collected.

Photo No.: 7
Date: 07/28/97

Time: 1300
Direction: W

Description: Expanded view of the northern portion of the Tank 55 containment area. The dumpsters were used to contain soils and gravels collected from contaminated material cleanup within the Tank 55 area and reportedly will be disposed off-site.

Photo No.: 8
Date: 07/28/97

Time: 1430
Direction: SE

Description: Close view of the Desalter Tank wastewater effluent piping and the collection location for sample DES-1.

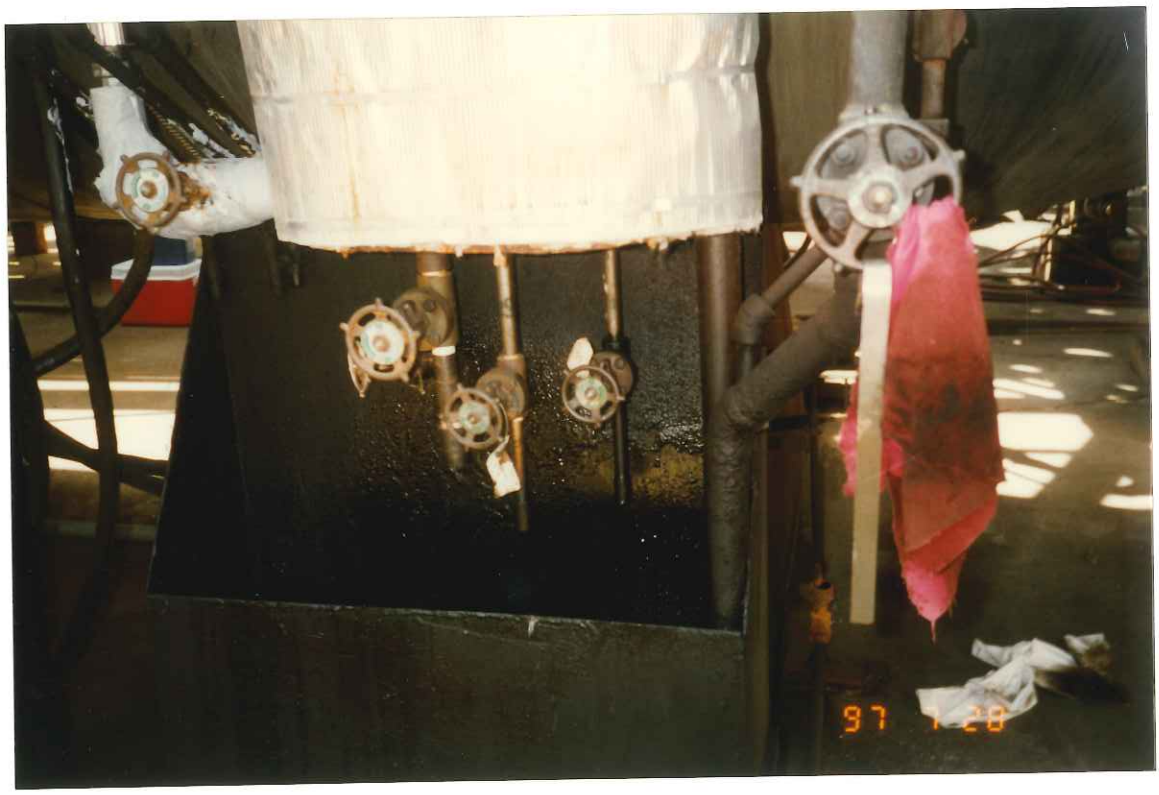


Photo No.: 9
Date: 07/28/97

Time: 1433
Direction: SW

Description: Close view of Desalter Tank effluent piping for bi-phasic material transfer. The piping was used to collect both the emulsion (rag layer) and the oil phase contents of the tank, designated as samples DES-2 and DES-3, respectively.

Photo No.: 10
Date: 07/28/97

Time: 1447
Direction: S

Description: Expanded view of the sample collection location at Tank 322/323 area (TK-322-1). The sample was collected from oily material located underneath the piping at the base of the photograph.

Photo No.: 11
Date: 07/28/97

Time: 1515
Direction: W

Description: Close view of the valve at the base of Tank 29, at the location where sample TK-29-B1 was collected. Note the oil sheen on the liquid on ground surface.

Photo No.: 12
Date: 07/28/97

Time: 1610
Direction: WSW

Description: View of the cover of Sump 38. Sample S-38-1 was collected through an access point within the cover. The unit is a subgrade liquid collection and transfer sump.

APPENDIX B

FIELD LOG

IF FOUND PLEASE RETURN TO:

NAME Rob Young

COMPANY A.T. Kearney, Inc.

STREET 222 West Adams

CITY Chicago STATE IL ZIP 60606

PHONE 312 223-6237

Reorder part # 101650
Phone # 800-241-6401

JOB BOOK

FROM BEN MEADOWS COMPANY

PROJECT NAME Clark Refining

PROJECT NUMBER 6200/R05-020-01-06

CREW Rob Young / John Koerner

DATE 7/28/97 BOOK # 1 OF 2

WEATHER Sunny, ~75°

FIELD BOOK
16 PAGE
8 LEAVES
50% RAG

CURVE FORMULAS

$T = R \tan \frac{1}{2} I$

$T = \frac{50 \tan \frac{1}{2} I}{\text{Sin. } \frac{1}{2} D}$

$\text{Sin. } \frac{1}{2} D = \frac{50}{R}$

$\text{Sin. } \frac{1}{2} D = \frac{50 \tan \frac{1}{2} I}{T}$

$R = T \cot. \frac{1}{2} I$

$R = \frac{50}{\text{Sin. } \frac{1}{2} D}$

$E = R \text{ ex. sec } \frac{1}{2} I$

$E = T \tan \frac{1}{4} I$

$\text{Chord def.} = \frac{\text{chord}^2}{R}$

$\text{No. chords} = \frac{I}{D}$

$\text{Tan. def.} = \frac{1}{2} \text{ chord def.}$

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.) and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

RIGHT ANGLE TRIANGLES. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. $10.10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. $25.25^2 \div 200 = 3.125$; $100 - 3.125 = 96.875$ = Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

LEVELING. The correction for curvature and refraction, in feet and decimals of feet is equal to $0.574\,d^2$, where d is the distance in miles. The correction for curvature alone is closely, $\frac{2}{3}d^2$. The combined correction is negative.

PROBABLE ERROR. If d_1, d_2, d_3, etc. are the discrepancies of various results from the mean, and if Σd^2 = the sum of the squares of these differences and n = the number of observations, then the probable error of the mean $= \pm 0.6745 \sqrt{\frac{\Sigma d^2}{n(n-1)}}$

MINUTES IN DECIMALS OF A DEGREE

1′	.0167	11′	.1833	21′	.3500	31′	.5167	41′	.6833	51′	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

INCHES IN DECIMALS OF A FOOT

1-16	3-32	1/8	3-16	1/4	5-16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729

1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

7/25/97

(1)

1100: ROB YOUNG OF A.T. KEARNEY RECEIVES THREE COOLERS FROM INTERTEK TESTING SERVICES (INTERTEK). ALL THE CUSTODY SEALS ARE INTACT. COOLERS SENT THROUGH FED EX.

1330: A FOURTH COOLER ARRIVES TO ROB YOUNG, AND THE CUSTODY SEALS WAS INTACT. COOLER SENT VIA FED EX.

ALL COOLERS WERE FIRST RECEIVED AT THE A.T. KEARNEY MAILROOM, AND TAKEN DOWN TO MR. YOUNG.

1500: YOUNG OPENS ALL COOLERS. ALL BOTTLES ARE INTACT WITH NO BREAKAGE. TRIP BLANKS ARE INCLUDED IN THE COOLERS.

7/25/97

7/26/97 (2)

1200: JOHN KOEHNEN OF A.T. KORNEY RECEIVES ONE COOLER FROM INTERTEK VIA FED EX. THE CUSTODY SEALS ARE IN-PLACE. THE COOLER CONTAINS FOUR TRIP BLANKS AND DEIONIZED WATER.

7/26/97

7/27/97 (3)

1400: YOUNG DECONTAMINATES ALL POLYPROPYLENE BEAKERS TO BE USED DURING CLARK SAMPLING. BEAKERS ARE DECONTAMINATED USING THE FOLLOWING PROCEDURES:

1. CLEAN/BRUSH WITH ALCONOX/TAP WATER WASH.
2. RINSE WITH TAP WATER
3. DOUBLE RINSE WITH DEIONIZED WATER
4. AIR DRY
5. PLACE CLEANED BEAKERS INTO PLASTIC BAGGIES.

YOUNG ALSO DECONTAMINATES A STAINLESS STEEL BOWL FOLLOWING THE ABOVE PROCEDURE. THE ABOVE PROCEDURE IS ALSO USED TO CLEAN 7 STAINLESS STEEL SPOONS. THIS EQUIPMENT MAY BE USED DURING THE CLARK SAMPLING.

7/27/97

7/28/97 (4)

0830: MEET WITH DAVID BEDNORZ, ENVIRONMENTAL ENGINEER AND JERRY E. FIELDS, P.E., ENVIRONMENTAL ENGINEER, CLARK REFINING.

ALSO PRESENT ARE:
ROB YOUNG, A.T. KEARNEY, INC.
JOHN KOERNER, " "
BRIAN FREEMAN, US EPA
REGION 5.

MR. FREEMAN IS OBSERVING A.T. KEARNEY ACTIVITIES.

CLARK WOULD LIKE TO USE A.T. KEARNEY'S BOTTLES FOR SPLIT SAMPLING.

CLARK WILL ACCEPT AT. KEARNEY'S PPE AND SAMPLING WASTES.

7/28/97

7/28/97 (5)

YOUNG EXPLAINS THE SAMPLING AREAS, AND SUPPLIES CLARK W/ HAND-WRITTEN NOTES ON SAMPLING LOCATIONS. CLARK MAKES COPIES (2), BUT YOUNG ASKS FOR COPIES BACK. CLARK RETURNS COPIES.

0900: YOUNG CALIBRATES THE TOXIRAE USING 100 PPM ISOBUTYLENE GAS. INSTRUCTIONS IN THE USER'S MANUAL WERE FOLLOWED. INSTRUMENT IS CALIBRATED TO 101 PPM. THE BACKGROUND READING RANGE FROM 0.9 PPM TO 2.1 PPM IN THE READING MODE.

0920: CLARK ALLOWS A.T. KEARNEY TO DRIVE INTO PLANT IN THE VAN. CLARK DISTRIBUTES "NOMEX" TO TEAM TO PROVIDE FIRE RETARDANT.

7/28/97

7/28/97

0940: MOVE TO TANK 55 TO COLLECT SAMPLES.

0950: YOUNG PLACES TRIP BLANKS INTO COOLER THAT WILL BE USED TO TRANSPORT SAMPLES AFTER COLLECTION.

1000: YOUNG/KOOTNEKA MOVE TO TANK 59 TO COLLECT SAMPLES.

TK-59-1 WILL BE COLLECTED FROM INFLUENT PIPE INTO TANK 59. A DUPLICATE OF TK-59-1 IS COLLECTED AT INFLUENT PIPE, DESIGNATE IT TK-59-2. SUFFICIENT VOLUME IS ALSO COLLECTED FOR MS/MSD. SAMPLES COLLECTED FOR:

- TCLP VOAS
- TCLP METALS

IN THE FOLLOWING CONTAINERS:

6-40 ml VIALS - TK-59-1 + MS/MSD (TCLP VOCs)
6-40 ml VIALS - " " (CLARK SPLIT)

7/28

2-500 ml POLY - TCLP METALS - TK-59-1 + MS/MSD
2-500 ml POLY - " " + MS/MSD (CLARK)
3-40 ml VIALS - TCLP VOCs - TK-59-2
3-40 ml VIALS - TCLP VOCs - " " (CLARK)
1-500 ml POLY - TCLP METALS - TK-59-2
1-500 ml POLY - " " TK-59-2 (CLARK)

TK-59-3 IS COLLECTED FROM A SUMP-LIKE AREA JUST EAST (APPROX 20 FEET) OF THE INFLUENT PIPE. IT IS APPROXIMATELY 6'X6' AND HAS FLOATING OIL. UPON COLLECTING THE VOC SAMPLES, THE PHASES SEPARATE IN THE CONTAINERS. CONTAINERS COLLECTED INCLUDE:

6 40 ml VIALS - TCLP VOC SAMPLE + MS/MSD
6 40 ml VIALS - " " (CLARK SPLIT)
2 500 ml POLY - TCLP METALS + MS/MSD
2 500 ml POLY " " (CLARK)

SAMPLE TIMES: TK-59-1 1000
TK-59-2 1000
TK-59-3 1020

7/28/97

1100: YOUNG AND KOEHNEN SPLIT SAMPLES APART - CLARK'S SAMPLED INTO ONE COOLER AND AJK'S INTO THE SECOND. YOUNG ADDS A TRIP BLANK TO CLARK'S COOLER.

1115: MOVE TO SAMPLE AT OVERFLOW PIT. EACH SAMPLE USING AN EXTENSION POLE ATTACHED TO A BEAKER. SAMPLES COLLECTED FOR TCLP VOCs AS FOLLOWS

3-40 ml VIALS - OP-1 (TCLP VOCs)
3-40 ml VIALS - OP-1 (" ")(CLARK)
3-40 ml VIALS - OP-2 (TCLP VOCs)
3-40 ml VIALS - OP-2 (" ")(CLARK)

OP-2 IS THE DUPLICATE OF OP-1. BOTH SAMPLES COLLECTED AT 1115.

7/28/97

THE OVERFLOW PIT CONTAINS SEVERAL INCHES OF BLACK, OIL-LIKE FLOATING PRODUCT. THE OIL IS ABOUT 4' BELOW THE TOP OF THE CONCRETE WALLS THAT COMPLETELY SURROUND IT. HYDROCARBON ODORS BETWEEN 0 AND 3 PPM WERE REGISTED IN THE AREA SURROUNDING THE UNIT. THERE IS A FAIRLY STIFF WIND FROM THE NORTH AND THE SOUTH SIDE OF THE UNIT SHOWS EVAPORATION RESPONSE ON THE TOPSOIL.

1165: MOVE TO TANK 55 FOR FOR RECONNAISSANCE. THE NORTH AND EAST SIDES OF THE TANK CONTAIN A LARGE AMOUNT OF PETROLEUM PRODUCT IN THE CONTAINMENT AREA THAT HAS BEEN COVERED W/ GRAVEL. BELOW THE OVERFLOW PIPE AND AT THE SUMP PIT THE PRODUCT HAS PURGED AND A TAR-LIKE SUBSTANCE COATS THE GROUND SURFACE.

7/28/97

1220: COLLECT SAMPLE TK-55-3 FROM A SMALL PIT AT THE BASE OF AN OVERFLOW PIPE. THE FOLLOWING VOLUMES ARE COLLECTED

TIME 1220
- 3 40ml VIAL - TCLP VOCs -
- 3 40 ml VIAL - " " (CLARK SPLIT)
- 1 500ml POLY - TCLP METALS
- 1 - 500ml POLY - " " (CLARK)

THE SAMPLE MATERIAL IS A WASTEWATER WITH A LIGHT BROWN FLOATING MATERIAL. THE FLOATING MATERIAL FORMS A SHEEN. THE POOLED AREA IS ABOUT 12' IN DIAMETER AND ABOUT 2-3' DEEP. COLLECTED BY SCOOPING MATERIAL USING BEAKER AND POURING IT INTO SAMPLE BOTTLES.

1245: COLLECT SAMPLE TK-55-1 AND ITS DUPLICATE, TK-55-2.

THE FOLLOWING SAMPLE BOTTLES WERE COLLECTED:

7/28/97

TCLP VOCs
- 1 40z JAR - TK-55-1 + MS/MSD
- 1 40z JAR - TCLP VOCs TK-55-1 + MS/MSD (CLARK)
- 1 40z JAR - TCLP METALS TK-55-1 + MS/MSD
- 1 40z JAR - TK-55-1 (TCLP METALS) + MS/MSD

- 1 40z JAR - TCLP VOCs - TK-55-2
- 1 4oz JAR - TCLP VOCs - TK-55-2 (CLARK)
- 1 40z JAR - TCLP METALS - TK-55-2
- 1 40z JAR - TCLP METALS - TK-55-2 (CLARK)

TK-55-1 AND ITS DUP, TK-55-2 WERE COLLECTED AT 1245 hrs 7/28/97. THEY WERE COLLECTED BY SKIMMING THE TAR-LIKE MATERIAL FROM THE GRASS SURFACE BELOW THE OVERFLOW PIPE. THE SAMPLES WERE COLLECTED BY SKIMMING THE MATERIAL DIRECTLY INTO THE SAMPLE JARS USING A STAINLESS STEEL SPOON. THERE IS INSUFFICIENT VOLUME TO COLLECT EACH SAMPLE TO COMPOSITE FOR METALS.

~~1320: YOUNG AND FREEMAN PERFORM RECONNAISSANCE OF TANKS 322 AND 323 CONTAINMENT AREAS.~~ PM

7/28/97

1300: MOVE TO REFINERY PORTION OF FACILITY.

1310: COLLECT FIELD BLANK IN REFINERY AREA. COLLECTED ~200-300 FEET FROM TANK 322/323 AREA. THE FOLLOWING BOTTLES ARE COLLECTED:

3-40ml VIALS w/HCl - TOTAL VOCs
3-40ml VIALS w/HCl - TOTAL VOCs (CLARK)
1-1L POLY w/ HNO_3 - TOTAL RCRA METALS
1-1L POLY " " " " " (CLARK)

FIELD BLANK DESIGNATED FB-1, COLLECTED AT 1310. COLLECTED BY JOHN KOCHNOW BY POURING DEIONIZED WATER FROM THE INTERTEK LABORATORY DIRECTLY INTO THE SAMPLE BOTTLES OUTLINED ABOVE. THE PRESERVATIVE ARRIVED IN THE BOTTLES, SO THE SAMPLES ARE NOT FURTHER PRESERVED (BEYOND WHAT WAS IN THE BOTTLES. CLARK BOTTLES ARE ALSO FILLED AT THIS LOCATION, AT CLARK'S REQUEST.

7/28/97

1320: YOUNG & FREEMAN y ARAMI w/ FIELDS DO RECONNAISSANCE OF AREA (CONTAINMENT) SURROUNDING TANKS 322 AND 323. THE AREA CONTAINS STAINED GRAVEL AND SEVERAL AREAS OF STANDING OILY LIQUID. THE STAINED/OILY LIQUID AREA COVERS ABOUT 40'x60' AREA.

1345: YOUNG SPEAKS w/ MARLIN DUSENBURY ABOUT SAMPLES AT TANKS 28 AND 29. MS. DUSENBURY WORKS FOR NETC (USCG) IN DENVER.

MS. DUSENBURY SUGGESTS COLLECTING A SAMPLE FROM TANK 29 (CONTENTS) IF POSSIBLE! YOUNG EXPLAINS THAT THE BOTTOM VALVES, ACCORDING TO CLARK REPRESENTATIVES, HAVE NOT BEEN OPENED IN OVER 4 YEARS. YOUNG EXPLAINS THAT CLARK IS RELUCTANT TO OPEN THE VALVES FOR FEAR OF SPILLAGE.

7/28/97

CLARK INDICATED THAT SAMPLES COULD BE COLLECTED FROM THE TOP OF THE TANK, BUT THAT THE MATERIAL IS CAUSTIC w/ A pH OF 14. MS. ROSENBURG REQUESTS THAT THE ATK TEAM COLLECT A SAMPLE, IF POSSIBLE.

1400: YOUNG AND KOEHNEN MOVE TO DESALTOR TANK. COLLECT WASTEWATER PORTION OF DESALTOR CAN SAMPLE DES-1 / COLLECTED AT 1400. THE FOLLOWING CONTAINERS ARE COLLECTED:

3-40ml VIALS - TCLP VOCs
3-40ml VIALS - TCLP VOCs (CLARK)

THE WATER AT DES-1 IS EXTREMELY HOT AND THE SAMPLE IS COLLECTED BY: ALLOWING THE WASTEWATER TO FILL A BEAKER, THEN POURING THE WASTEWATER INTO SAMPLE BOTTLES (40ml VIALS) STANDING UPRIGHT IN FOAM INSERTS. THE FOAM IS NEEDED TO PREVENT BURNS.

7/28/97

AFTER FILLING THE DES-1 VIALS w/ THE HOT WASTEWATER, THE VIALS ARE PLACED INTO AN ICED COOLER FOR STORAGE/PACKAGING.

1415: YOUNG AND KOEHNEN COLLECT THE EMULSION LAYER OF DESALTOR CAN SAMPLE DES-2, AT 1415. THE FOLLOWING CONTAINERS ARE COLLECTED:

3-40ml VIALS - TCLP VOCs
3-40ml VIALS - TCLP VOCs (CLARK)

THE SAMPLES ARE COLLECTED IN THE SAME MANNER AS AT DES-1.

THE EMULSION MATERIAL APPEARS TO CONTAIN A GREATER AMOUNT OF OIL. IT IS NOT POSSIBLE TO ELIMINATE ALL AIR BUBBLES DUE TO THE HEAT OF THE SAMPLES AND THE DIFFERENT PHASES.

7/28/97

(16)

1425 - YOUNG AND KOETHEN COLLECT "CRUDE" PORTION OF DESALTER TANK. DESIGNATE SAMPLE DES-3, AT 1425. THE FOLLOWING CONTAINERS ARE COLLECTED.

3-40ML VIALS - TCLP VOCS
3-40ML VIALS - TCLP VOCS (BLANK)

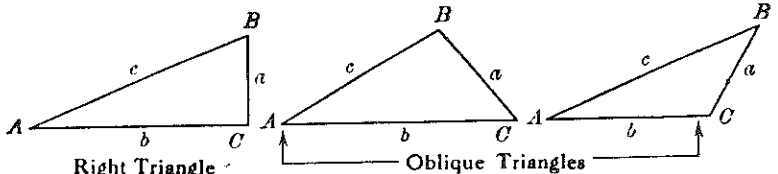
THE OILY MATERIAL IS SOMEWHAT "EMULSION" THAN WASTEWATER, AND SETS OFF THE PID AT BETWEEN 2 AND 5 PPM.

THE DES-3 SAMPLE IS COLLECTED IN SAME MANNER AS DES-1. ALSO IT IS HARD TO ELIMINATE ALL AIR BUBBLES, AS THE SAMPLE MATERIAL IS VERY OILY AND HOT.

CONTINUE W/ NEXT LOGBOOK

7/28/97

TRIGONOMETRIC FORMULAS



Solution of Right Triangles

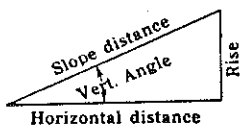
For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

Given	Required	
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B, c = \sqrt{a^2 + b^2} = a\sqrt{1 + \frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B, b = \sqrt{(c+a)(c-a)} = c\sqrt{1 - \frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90° - A, b = a \cot A, c = \frac{a}{\sin A}$
A, b	B, a, c	$B = 90° - A, a = b \tan A, c = \frac{b}{\cos A}$
A, c	B, a, b	$B = 90° - A, a = c \sin A, b = c \cos A$

Solution of Oblique Triangles

Given	Required	
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A}, C = 180° - (A + B), c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a}, C = 180° - (A + B), c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180° - C, \tan \frac{1}{2}(A - B) = \frac{(a-b)\tan \frac{1}{2}(A+B)}{a+b}, c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a+b+c}{2}, \sin \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}}, \sin \frac{1}{2}B = \sqrt{\frac{(s-a)(s-c)}{ac}}, C = 180° - (A + B)$
a, b, c	Area	$s = \frac{a+b+c}{2}$, area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL



Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = 5° 10′. Since cos 5° 10′ = .9959, horizontal distance = 319.4 × .9959 = 318.09 ft.

Horizontal distance also = Slope distance minus slope distance times (1 - cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. Cosine 5° 10′ .9959. 1 − .9959 = .0041. 319.4 × .0041 = 1.31. 319.4 − 1.31 = 318.09 ft.

When the rise is known, the horizontal distance is approximately the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft., slope distance = 302.6 ft. Horizontal distance = $302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.

SITE-SPECIFIC SAMPLING AND ANALYSIS PLAN
WASTE SAMPLING

Clark Refining and Marketing, Inc.
Blue Island, Illinois
EPA ID NO. ILD005109822

The following constitutes the Site-Specific Sampling and Analysis Plan (SAP) for waste sampling to be performed at the Clark Refining and Marketing, Inc. (Clark) facility in Blue Island, Illinois. The sampling activities will be conducted on July 28, 1997.

This SAP will be used in conjunction with A.T. Kearney's, U.S. EPA-approved Region 5 Generic Quality Assurance Project Plan (QAPP) for Sampling Operations, dated January 1995. The A.T. Kearney Sampling Team has selected Interteck Testing Services of Richardson, Texas to perform the analyses required under this SAP. Interteck Testing Services is a Kearney Team subcontractor.

Purpose and Objective

This SAP has been prepared to allow for the collection and analysis of waste samples at the Clark site. The waste samples will be collected from various locations throughout the facility, as directed by Mr. Allen Wojtas, the U.S. EPA Region 5 Technical Contact for this sampling event. The samples will be analyzed by Interteck Testing Services using the Toxicity Characteristics Leaching Procedure (TCLP) for volatile organic compounds (VOCs) and metals, and pH to aid in determining if the materials can potentially be classified as toxic hazardous wastes.

Background Information

Clark operates an oil refinery that processes up to 70,000 barrels of crude oil per day. The principal products include gasoline, liquid petroleum gas, heating fuel, jet fuel, diesel fuel and asphalt. The site is located at 13100 S. Kedzie Avenue, Blue Island, Illinois, approximately 15 miles south of downtown Chicago. Pollution control, and waste generation and management operations are regulated by U.S. EPA and Illinois EPA (IEPA) environmental permits and regulations.

Several processes are know to generate characteristic and/or listed hazardous waste at the Clark facility. These processes and associated waste codes include, but are not limited to, crude distillation (D001, D018), fluid catalytic cracking (D002), HF alkylation (D002), hydrocracking (D001, D003), catalyst regeneration (D001), wastewater treatment and collection (D018, F037, F038, K048, K049, K051) and miscellaneous smaller processes (primarily D001, D002, D008, D018).

The National Enforcement Investigations Center (NEIC) of U.S. EPA conducted a multi-media inspection of the Clark facility during the week of March 2, 1997. At the time of the inspection, possible violations were reportedly identified which involved the suspected illegal discharge, storage and/or disposal of potentially hazardous waste (untreated refinery process wastewaters) into secondary containment of several tanks. Additional sampling will be conducted during the subject sampling event to verify the assumption that hazardous wastes are being illegally stored and/or disposed at the Clark facility.

Desalter Tank Sampling

The Kearney Team will obtain one field sample from each of the three sampling taps at the Desalter Tank. It is expected that the samples will be crude oil, rag layer and the third will be wastewater. Sample aliquots will be obtained by filling the appropriate sample containers directly from the sampling taps over a bucket to contain any spillage. The resulting samples will be analyzed for TCLP VOCs. The crude oil, rag layer and wastewater will be considered to be three different matrices for determining appropriate quality control (QC) samples. Additional discussion of the collection of QC samples is provided below.

Tank 28 and 29 Area Sampling

One field sample will be obtained from the valve at the bottom of Tank 29 which was observed to be leaking onto the ground in the containment area. A second field sample will be obtained from the valve at Tank 28. The sample aliquots will be obtained by filling the appropriate sample containers directly from the valves over a bucket to contain any spillage. The resulting samples will be analyzed for TCLP VOCs and pH. Due to the very short holding time for pH analysis, these will be the final samples obtained during the sampling event.

In addition, if pooled liquid material is observed on the ground below the valve at Tank 29, a sample of the leaked material will be collected. Dependent upon the amount of pooled material, the sample aliquots will be obtained either directly into the appropriate sample containers or, if necessary, by using a disposable polypropylene beaker. The resulting sample will be analyzed for TCLP VOCs.

The three samples discussed above will be considered to be of the same matrix for determining appropriate QC samples. Additional discussion of the collection of QC samples is provided below.

Tanks 322 and 323 Containment Area

The containment area for Tanks 322 and 323 will be visually inspected to locate spilled petroleum material. If oily liquid is present in the containment area, one field sample will be taken. Depending upon the amount and location of the material, sample aliquots will be obtained either directly into the appropriate sample containers, or, if necessary, by using a disposable

polypropylene beaker attached to a handle. The resulting sample will be analyzed for TCLP VOCs.

Tank 59 Area Sampling

The area surrounding the Tank 59 sump will be visually inspected to locate areas of spillage of petroleum materials. If oily material is located in the area, up to two field samples will be obtained dependent upon the phases of spilled material present. Sample aliquots of spilled liquid phase waste will be obtained either directly into the appropriate sample containers or, if necessary, by using a disposable polypropylene beaker. The method of sample collection will be determined based on the amount and location of the spilled material. If solid or sludge-like spilled material is also found, sample aliquots of these solids will also be obtained. The solid materials will be transferred directly into appropriate sample containers using a stainless steel spoon. The resulting samples will be analyzed for TCLP VOCs and TCLP metals.

In addition, one field sample will be obtained from the influent sample tap on Tank 59. The sample aliquots will be obtained by filling the appropriate sample containers directly from the valve over a bucket to contain any spillage. The resulting sample will be analyzed for TCLP VOCs and TCLP metals.

The overflow pit adjacent to the Tank 59 sump area will be visually inspected to locate areas of spillage of petroleum materials. If oily material is located in the area, up to two field samples will be obtained dependent upon the phases of spilled material present. Sample aliquots of spilled liquid and/or solid phase wastes will most likely be obtained using a disposable polypropylene beaker attached to a handle. The resulting samples will be analyzed for TCLP VOCs.

For the purposes of determining appropriate QC samples, the liquid spilled materials samples and tap samples obtained in the Tank 59 area will be considered to be of the same matrix, and solid spilled materials samples of a second matrix. Additional discussion of the collection of QC samples is provided below.

Tank 55 Outfall Area

The area directly beneath the iron pipe attached to Tank 55 which discharges to the associated dike will be visually inspected to locate areas of spillage of petroleum materials. If oily material is located in the area, up to two field samples will be obtained dependent upon the phases of spilled material present. Sample aliquots of spilled liquid phase waste will be obtained either directly into the appropriate sample container or, if necessary, by using a disposable polypropylene beaker. The method of sample collection will be determined based on the amount and location of the spilled material. If solid or sludge-like spilled material is also found, sample aliquots of these solids will also be obtained. The solid materials will be transferred directly into appropriate sample containers using a stainless steel spoon. The resulting samples will be analyzed for TCLP VOCs and TCLP metals.

The liquid and solid materials will be considered to be two different matrices for determining appropriate QC samples. Additional discussion of the collection of QC samples is provided below.

Junction Box 38 Sump

The concrete sump associated with Junction Box 38 will be visually inspected to locate spilled petroleum material. One field sample will be obtained from the oily liquid material in the sump. Depending upon the amount and location of the material, sample aliquots will be obtained either directly into the appropriate sample container, or, if necessary, by using a disposable polypropylene beaker attached to a handle. The resulting sample will be analyzed for TCLP VOCs.

Decontamination

The sampling equipment (stainless steel spoons, polypropylene beakers, etc.) will be cleaned in the office, prior to field operations, using the procedure outline below, allowed to air dry, and will be wrapped in aluminum foil before being shipped to the facility. Field decontamination of sampling equipment, if required, will also follow the procedure outlined below. Clark representatives have preliminarily indicated that decontamination water can be appropriately handled for disposal on-site.

The decontamination procedure will be:

- Line the decontamination area with a sheet of polyethylene sheeting.
- In a 5-gallon bucket, wash the equipment with an alconox and tap water mixture.
- Rinse the equipment with deionized water, capturing any rinse water in a 5-gallon bucket.
- Wipe the equipment clean with a paper towel.

Quality Control Samples

Matrix spike/matrix spike duplicates (MS/MSD) and a field duplicate will be collected for each matrix sampled. It is currently anticipated that oily liquid waste materials, solid/sludge-like materials, wastewaters and crude product will be considered as separate matrices. Final determinations as to appropriate matrix determinations will be made in the field based on sample consistency and source material information obtained in the field. Duplicate and MS/MSD sample locations for each matrix will be determined in the field based on the amount of material available for sampling at each location.

A field blank consisting of deionized water, will be obtained and analyzed for VOCs and metals. A trip blank will be included in each shipping cooler containing sample aliquots to be analyzed for VOCs.

All quality control samples will be collected in accordance with the U.S. EPA-approved A.T. Kearney Generic QAPP.

Sample Collection and Data Record

The samples collected by A.T. Kearney will remain in the custody of the A.T. Kearney field personnel until relinquished for shipment to the analytical laboratory. The sample bottles will be appropriately labeled (label affixed directly on the face of the bottle) and tagged with sample tags. A chain-of-custody (COC) form will accompany the samples from the point of origin to the analytical laboratory. The samples will be collected in containers specified in Section 6 of the U.S. EPA approved A.T. Kearney Generic QAPP. This section also identifies preservation techniques. All samples will be collected in "certified-clean" sample containers obtained from the laboratory or an analytical supply vendor.

In addition, A.T. Kearney will be equipped with sufficient appropriate sample containers and labels to provide facility representatives with split samples from each location to be sampled during this event.

Analytical Requirements

The samples will be analyzed for the parameters specified under each sampling area above. TCLP VOCs analysis will be performed using the TCLP (SW-846 Method 1311) and SW-846 Method 8240. The TCLP metals analysis will be performed using the TCLP (SW-846 Method 1311) and the SW-846 Method 6010/7000 Series. The metals to be analyzed for are arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver. The analytical and QA/QC requirements for the laboratory are outlined in the U.S. EPA-approved A.T. Kearney Generic QAPP.

All samples will be shipped via overnight carrier in coolers to Interteck Testing Services (1089 East Collins Boulevard, Richardson, Texas, Attention: Sample Control).

Data Validation

Analytical data will be generated by the subcontractor laboratory and provided to A.T. Kearney in conformance with CLP-like reporting protocols. The resulting data will undergo a 100 percent data validation effort by a member of the Kearney Team, independent of the sampling team. This validation will be in conformance with the Functional Guidelines for Organic and Inorganic Data Validation. Specific data package and data validation requirements are outlined in the U.S. EPA-approved A.T. Kearney Generic QAPP.

Project Schedule and Report Deliverables

The sampling activities will be performed on July 28, 1997. The samples will be analyzed on a rush schedule, with the full data package to be delivered by the laboratory within 14 days of sample receipt. A draft report which presents the findings of the field activities, sampling, analysis and validation will be generated within 10 days of receiving the laboratory data package. If requested by the U.S. EPA Technical Contact, a final report will be submitted within five days of receiving U.S. EPA comments. The draft and final reports will include the information requested in the Technical Direction Memorandum dated July 15, 1997.

Project Organization

Mr. Brian Freeman is the EWAM for this project. Mr. Allen Wojtas is the U.S. EPA Technical Lead and RCRA representative for the site visit. The A.T. Kearney WAM for this project is Ms. Patricia Brown-Derocher. The A.T. Kearney Technical Lead and Site Safety Officer for the site visit is Mr. Robert Young. Mr. John Koehnen of A.T. Kearney will provide additional technical expertise in obtaining the waste samples.

The laboratory for this project is the Interteck Testing Services in Richardson, Texas. Data validation will be performed by appropriately qualified members of the Kearney Team independent of sampling personnel.

SITE-SPECIFIC SAMPLING AND ANALYSIS PLAN
WASTE SAMPLING
CLARK REFINING AND MARKETING, INC., BLUE ISLAND, ILLINOIS
EPA ID NO. ILD005109822
TASK 05 DELIVERABLE

Submitted to:

Mr. Brian Freeman
U.S. EPA Environmental Protection Agency
Region 5 DRE-8J
77 West Jackson Boulevard
Chicago, Illinois 60604

Submitted By:

A.T. Kearney, Inc.
222 West Adams Street
Chicago, Illinois 60606

EPA Work Assignment No.	**R05020**
Contract Number	**68-W4-0006**
A.T. Kearney WAM	**Patricia Brown-Derocher**
ATK WAM Telephone No.	**(312) 223-7088**
EPA WAM	**Brian Freeman**
EPA WAM Telephone No.	**(312) 353-2720**

July 24, 1997

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A.T. KEARNEY

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312 648 0111
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RZ2.R05020.01.ID.01.148

July 24, 1997

Mr.Brian Freeman
U.S. Environmental Protection Agency
Region 5 DRE-8J
77 West Jackson Boulevard
Chicago, IL 60604

Reference: EPA Contract No. 68-W4-0006; Work Assignment No. R05020; Clark Refining and Marketing, Inc.; Blue Island, Illinois; EPA ID No. ILD005109822; Site-Specific Field Sampling and Analysis Plan - Waste Sampling; Task 05 Deliverable

Dear Mr. Freeman:

Please find enclosed A.T. Kearney's Site-Specific Sampling and Analysis Plan (SAP) for sampling activities proposed at the Clark Refining and Marketing, Inc. (Clark) facility in Blue Island, Illinois. This SAP has been prepared according to your July 15, 1997 TDM and conversations with Mr. Allen Wojtas, U.S. EPA Region 5, the Technical Contact for this activity. The SAP allows for the collection and analysis of waste samples at the Clark site. The samples will be collected and analyzed for various combinations of pH, TCLP volatile organic compounds (VOCs) and TCLP metals.

Please feel free to contact me or Mr. Robert Young, the A.T. Kearney Team Technical Lead at (312) 223-6237 if you have any questions.

Sincerely,

Patricia Brown-Derocher

Patricia Brown-Derocher
Regional Manager

cc: F. Norling, EPA Region 5 (w/out attachment)
A. Wojtas, EPA Region 5
W. Jordan
R. Young
A. Williams

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SITE INVESTIGATION REPORT

For

80s Tank Farm
Clark Oil and Refining Corporation
Blue Island, Illinois

Prepared for:

Clark Oil and Refining Corporation
131st Street and Kedzic Avenue
Blue Island, Illinois 60406

Prepared by:

BLACK & VEATCH Waste Science, Inc.

September 1994

1.0 Introduction

The purpose of this investigation was to characterize the subsurface conditions and define the nature of contamination (if any) coming from a buried benzene line running through the 80s Tank Farm at the Clark Oil and Refining Corporation Blue Island Refinery in Blue Island, Illinois. The scope of the investigation included a reconnaissance of the area, subsurface exploration, field and laboratory testing of soil and groundwater, and evaluation of the laboratory data from the site.

The investigation was conducted on June 30 and July 1, 1994. Black & Veatch Waste Science, Inc. staff directed the work. The Geoprobe® unit was provided by Burlington Environmental. Environmental Monitoring and Technologies, Inc. performed the laboratory analyses.

1.1 Investigation Procedures

The investigation included collecting soil and groundwater samples at 7 locations in the 80s Tank Farm area. All samples were analyzed for the presence of benzene, ethylbenzene, toluene and xylene (BETX). Procedures outlined in the sampling plan for the investigation were followed to collect the samples. A copy of the sampling plan is provided in Appendix A.

1.2 Site Location and Background

A description of the site, and the background of this project are provided in the sampling plan (Appendix A).

The geology of the Blue Island area consists of unconsolidated glacial and lake deposits over Silurian bedrock. The unconsolidated materials in the vicinity of the refinery range from 25 to 40 feet thick and are comprised of silt, clay, and sand. In general, the surface of the site is underlain by fill that consists of dark brown silt and clayey silt, or light gray and brown sand. The fill is encountered as deep as 9 feet below grade. Glacial tills comprised of tight silts and clays are encountered between 8 and 14 feet below grade. A highly organic peat layer occurs at some locations between the fill and glacial till. The peat layer ranges from approximately 4 inches to 2 feet thick. Sands and gravels with numerous limestone fragments are encountered beneath the glacial till (14 feet below grade). Bedrock, composed of Silurian dolomite is encountered between 25 and 40 feet below grade at the refinery.

Variable subsurface conditions combined with the presence of manmade structures creates complex hydrogeologic conditions at the site. Localized perched groundwater occurs throughout the region. Perched groundwater is encountered within a few feet of the ground surface in the vicinity of the site. The lateral extent of perched groundwater beneath the site is unknown. A shallow groundwater aquifer occurs in the unconsolidated soils beneath the glacial till. Water levels in the shallow aquifer occur between 12 and 30 feet below grade. Groundwater levels measured in three shallow aquifer wells (installed by USGS) at the refinery suggest a southeastern flow direction towards the Calumet Sag Channel. The hydrogeologic relationship between the Channel and the shallow aquifer is unknown.

Bedrock aquifers in the Blue Island area are used as a source of water for municipal wells. There are 3 municipal wells used by the City of Blue Island approximately 2 to 3 miles east of the refinery.

1.3 Deviations from Proposed Plan

Field conditions necessitated some changes to the original sampling plan for the project. The original sampling plan called for three samples to be collected from each sampling location as follows:

- First fluid encountered.
- Subsurface soil sample collected at 3 feet below ground surface.
- Second fluid encountered.

The purpose of collecting a shallow and deep fluid sample was to determine if a light non-aqueous phase liquid (LNAPL) is present on the shallow water bearing unit in the area. If an LNAPL was encountered, the material would be sampled to evaluate its composition. Then, deeper groundwater beneath the LNAPL would be sampled to determine if a dissolved phase of the LNAPL was present in the groundwater. At most locations, the presence of an LNAPL was not detected, so it was not necessary to collect a deep groundwater sample. At these locations, only a shallow groundwater sample was collected since potential groundwater contamination at the site would most likely occur in the shallow portion of the uppermost water bearing unit. The Geoprobe® used at the site was not capable of collecting groundwater samples from discrete intervals since water could flow freely down the probe as the probe advanced; therefore, discrete groundwater samples from deeper intervals would

LIGHT NON-AQUEOUS phase liquid (LNAPL)

not necessarily be representative of conditions of that interval. In most cases, shallow and deep groundwater samples from the uppermost water bearing unit would have been redundant since the results would have been from the same groundwater.

Groundwater samples were not collected from two sampling locations (Locations 3 and 6) since groundwater was not encountered during probing. At these locations, a deeper soil sample was collected as a substitute for the groundwater sample. The deeper soil sample was collected to evaluate the vertical extent of soil contamination.

Another change created by field conditions was a modification in the method of preservation of groundwater samples. All groundwater samples were to be preserved with hydrochloric acid (HCl) and placed on ice immediately after collection. The first few groundwater samples reacted with the HCl when placed in the VOA vials preventing the sample from having zero headspace. The analytical laboratory was notified of the problem. The laboratory representative directed the field staff to collect the groundwater samples without HCl as a preservative. The absence of HCl preservative was noted with each sample so that laboratory holding times would not be exceeded.

An addition to the sampling plan was made at Location 1 where a temporary well was installed to determine if an LNAPL was present at this location. The procedures and results of this action are presented in Section 2.0.

2.0 Analytical Results

This section summarizes observations and analytical results for each of the sampling locations. All analytical results are presented in Table 2-1. Appendix B contains analytical data returned from the laboratory.

Location 1

Location 1 is the only sampling location outside the 80s Tank Farm berm area. Location 1 is adjacent to the benzene line and approximately 55 feet west of the ladder post on the south side of the vapor sphere. The purpose of sampling at this location was to determine if soil or groundwater has been contaminated by the benzene line before the line enters the 80s Tank Farm. One shallow soil sample (2-4 feet bgs) and two groundwater samples were collected at Location 1. Soil in the sampling interval had a strong hydrocarbon odor, and PID measurements on the soil were as high as 200 ppm. Measurements with the Gastech indicated benzene concentrations in excess of 60 ppm. The concentration of benzene in the shallow soil sample was 122 ppm. The total BETX concentration in this sample was 124 ppm.

Groundwater was encounted during probing at Location 1 at approximately 2.5 feet bgs. A sample of this shallow groundwater had a benzene concentration of 500 ppm. The total BETX concentration in the shallow groundwater sample at Location 1 was 518 ppm. To determine if an LNAPL was present on the shallow groundwater surface, a 40 milliliter (ml) vial was partially filled and left undisturbed for approximately five minutes. At the end of five minutes, there appeared to be some phase separation of the liquid in the vial, with a 1 to 2 millimeter layer occurring on top of the liquid. The probe at Location 1 was extended to approximately 12 feet bgs and a 1 inch diameter PVC screen (with 0.01 inch slots) was placed in the hole. This screen was exposed to the formation from 2.5 to 11.5 feet bgs. This temporary well was left overnight in an attempt to observe whether an LNAPL was present at this location. The following day, a flexible piece of clear Tygon tubing was lowered into the temporary well and retrieved to observe the static fluid present. Phase separated liquids were not observed in the tube, but vapors were observed emanating from the well when it was first opened. A downhole measurement of the air in the well using a Gastech exceeded the filter limit of 60 ppm for benzene. Contents of the tube lowered into the well were poured into

Table 2-1
Sample Identification and Analytical Summary
80s Tank Farm Investigation
Clark Oil and Refining Corporation

Sample No.	Sample Location	Matrix	Benzene Concentration	Ethylbenzene Concentration	Toluene Concentration	Xylene Concentration	Total BETX
1-Soil-Sh	Shallow soil from outside (south) the 80s Tank Farm.	Soil	122	0.571	0.498	1.53	124
1-SGW	Shallow groundwater from Location 1.	Groundwater	500	2.9	1.5	14.2	518
1-DGW	Deep groundwater from Location 1.	Groundwater	398	0.118	3.0	0.547	402
2-Soil-Sh	Shallow soil from southeast corner of 80s Tank Farm.	Soil	0.007	ND	0.005	ND	0.012
2-SGW	Shallow groundwater from Location 2.	Groundwater	0.004	ND	ND	ND	0.004
3-Soil-Sh	Shallow soil from east-central portion of 80s Tank Farm.	Soil	125	11.4	34.1	49.7	220
3-Soil-Dp	Deep soil from Location 3 (9-10').	Soil	0.534	0.015	0.073	0.095	0.717
4-Soil	Shallow soil from northeast portion of 80s Tank Farm.	Soil	0.003	0.019	0.004	0.071	0.097
4-SGW	Shallow groundwater from Location 4.	Groundwater	0.002	0.011	0.003	0.041	0.057
5-Soil-Sh	Shallow soil from southwest portion of 80s Tank Farm.	Soil	6.28	25.7	65.5	106	204
5-SGW	Shallow groundwater from Location 5.	Groundwater	0.233	0.115	0.493	0.598	0.995
6-Soil-Sh	Shallow soil from west-central portion of 80s Tank Farm.	Soil	164	2.76	5.59	9.74	182

Table 2-1 (Continued)
Sample Identification and Analytical Summary
80s Tank Farm Investigation
Clark Oil and Refining Corporation

Sample No.	Sample Location	Matrix	Benzene Concentration	Ethylbenzene Concentration	Toluene Concentration	Xylene Concentration	Total BETX
6-Soil-Dp	Deep soil from Location 6 (9-11').	Soil	32.1	0.015	0.054	0.032	32.2
7-Soil	Shallow soil from northwest portion of 80s Tank Farm.	Soil	6.28	25.7	65.5	106	204
7-SGW	Shallow groundwater from Location 7.	Groundwater	21.4	40.8	102	29.4	194

Notes:
- All results are in parts per million (ppm).
- The detection limit for each BETX compound was 0.001 ppm.
- All shallow soil samples are from 2-4 foot interval. Intervals for deep soil samples are included in the table.

40 ml vials for groundwater sampling. This groundwater sample was labelled as 1-DGW (deep groundwater) and submitted for analysis. The temporary well materials were pulled from the hole and disposed of with the rest of the investigation derived waste. The hole was filled with bentonite. The concentration of benzene in 1-DGW was 398 ppm. The total BETX concentration in this sample was 402 ppm.

Location 2

Location 2 was placed in the southeast corner of the 80s Tank Farm in the cell containing Tank 85. One shallow soil sample and one shallow groundwater sample were collected from Location 2. The shallow soil sample was collected from the 2-4 foot bgs interval. Groundwater, which was encountered between 1 and 2 feet below the surface, was collected from the probe used to collect the soil sample. Soil at the surface and from the sampling interval was stained (black) and had a hydrocarbon odor. In addition, the groundwater sample was opaque.

The shallow soil sample at Location 2 (2-Soil-Sh) had a benzene concentration of 0.007 ppm. The total BETX concentration of the soil sample was 0.012 ppm. The shallow groundwater sample at Location 2 (2-SGW) had a benzene concentration of 0.004 ppm and a total BETX concentration of 0.004 ppm.

Location 3

Location 3 was placed in the east-central portion of the 80s Tank Farm in the cell containing Tank 83. The location was approximately 5 feet east of the benzene line. One shallow and one deep soil sample were collected from Location 3. Groundwater was not encountered while probing Location 3. Furthermore, groundwater did not accumulate in the probe after approximately 30 minutes. A deep soil sample (9-10 feet bgs) was collected at Location 3 as a substitute for a groundwater sample at this location. The chosen interval for the deep soil sample was determined based on subsurface conditions, to evaluate the vertical extent of observed contamination.

Soil from the shallow soil sample interval (2-4 feet bgs) was stained and had a hydrocarbon odor. PID measurements from the probe hole were as high as 160 ppm. Gastech measurements indicated benzene concentrations in excess of 60 ppm, xylene concentrations in excess of 250 ppm and toluene concentrations in excess of 100 ppm. At approximately 10 feet bgs, probing became more difficult as tight cohesive soils (silt and clay) were encountered. A stained layer of organic material with a

hydrocarbon odor, was present immediately above these cohesive soils. The deep soil sample from Location 3 was collected from this transition interval.

The shallow soil sample from Location 3 (3-Soil-Sh) had a benzene concentration of 125 ppm, and a total BETX concentration of 220 ppm. The deep soil sample from Location 3 (3-Soil-Dp) had a benzene concentration of 0.534 ppm and a total BETX concentration of 0.717 ppm.

Location 4

Location 4 was placed in the northeast portion of the 80s Tank Farm in the cell containing Tank 81. Location 4 was close to the area where benzene was first encountered during a previous excavation (Appendix A). One shallow soil sample and one shallow groundwater sample were collected from this location. A deep groundwater sample was attempted at Location 4, but flowing silts and sands entered the perforations in the geoprobe and prevented the collection of a representative sample.

The shallow soil sample from Location 4 (4-Soil) had a benzene concentration of 0.003 ppm. The total BETX concentration in the sample was 0.097 ppm. The shallow groundwater sample from Location 4 (4-SGW) had a benzene concentration of 0.002 ppm and a total BETX concentration of 0.057 ppm. Concentrations of 5 ppm or less were detected by air monitoring instruments during probing. A tight cohesive unit (silt and clay) was encountered at approximately 10 feet bgs.

Location 5

Location 5 was placed in the southwest portion of the 80s Tank Farm in the cell containing Tank 86. One shallow soil sample and one shallow groundwater sample were collected from this location. The shallow soil sample (5-Soil-Sh) had a benzene concentration of 6.28 ppm and a total BETX concentration of 204 ppm. Ethylbenzene, toluene, and xylene were detected at concentrations of 25.7 ppm, 65.5 ppm, and 106 ppm, respectively. The shallow groundwater sample (5-SGW) had a benzene concentration of 0.233 ppm and a total BETX concentration of 0.995 ppm. Ethylbenzene, toluene, and xylene were detected in 5-SGW at concentrations of 0.115 ppm, 0.493 ppm and 0.598 ppm, respectively.

Location 6

Location 6 was placed in the west-central portion of the 80s Tank Farm in the cell containing Tank 84. The location was approximately 10 feet west of the benzene line. One shallow and one deep soil sample were collected from Location 6. As with Location 3, which was also in the central portion of the 80s Tank Farm, groundwater was not encountered while probing to a total depth of 15 feet bgs. Futhermroe, groundwater did not accumulate in the probe after an hour. A deep soil sample (9-11 feet bgs) was collected as a substitute for a groundwater sample at this location. The chosen interval for the deep soil sample was determined based on subsurface conditions to evaluate the vertical extent of any contamination detected.

Soil from the shallow soil sample interval at Location 6 (2-4 feet bgs) was stained (black) and had a hydrocarbon odor. PID measurements from retrieved soil were as high as 160 ppm. The probe met some resistance at approximately 11 feet bgs as it entered a tight cohesive layer of silt and clay. The deep soil sample at Location 6 (6-Soil-Dp) was collected from a visibly stained interval above the cohesive layer (9-9.5 feet bgs). Soil from the deep interval had a hydrocarbon odor, and PID measurements on the soil were 50 ppm.

The shallow soil sample (6-Soil-Sh) had a benzene concentration of 164 ppm and a total BETX concentration of 182 ppm. The deep soil sample (6-Soil-Dp) had a benzene concentration of 32.1 ppm and a total BETX concentration of 32.2 ppm.

Location 7

Location 7 was placed in the northwest portion of the 80s Tank Farm in the cell containing Tank 82. One shallow soil sample and one shallow groundwater sample were collected from Location 7. The shallow soil sample (7-Soil) had a benzene concentration of 6.28. The total BETX concentration was 204 ppm. The concentrations of ethylbenzene, toluene, and xylene in this shallow soil sample were 25.7 ppm, 65.5 ppm, and 106 ppm, respectively. The shallow groundwater sample at Location 7 (7-SGW) had a benzene concentration of 21.4 ppm and a total BETX concentration of 194 ppm. Ethylbenzene, toluene, and xylene were detected at concentrations of 40.8 ppm, 102 ppm, and 29.4 ppm, respectively, in the groundwater sample. In addition, a sheen was observed on the shallow groundwater sample from Location 7.

3.0 Summary

The purpose of this investigation was to characterize the subsurface conditions and define the nature of contamination (if any) coming from a buried benzene line running through the 80s Tank Farm at the Clark Oil and Refining Corporation Blue Island Refinery. The investigation included a reconnaissance of the area, subsurface exploration, field and laboratory testing of soil and groundwater, and evaluation of the laboratory data from the site.

A total of 15 samples, 9 soil and 6 groundwater, were collected from 7 sampling locations as depicted on Figure 1-2 in Appendix A. The samples were collected using a Geoprobe®. Sample locations and results, visual observations made in the field, and monitoring results are presented in Section 2.0. All samples were analyzed for BETX compounds, with benzene being the primary contaminant of concern. Benzene was detected in all soil and groundwater samples.

The concentration of benzene in soil samples ranged from 0.003 ppm (the shallow soil sample from location 4) to 164 ppm (the shallows sample from Location 6). The highest concentrations of benzene in soil were present at locations 1, 3, and 6. Of all of the sample locations, these three sampling locations were closest to the buried benzene line. Location 1 was adjacent to the benzene line outside the bermed area for the 80s Tank Farm. Locations 3 and 6 both occur in the center cell of the bermed area, adjacent to the benzene line. Locations 2, 4, 5, and 7 were located close to the corners of the 80s Tank Farm to evaluate the extent of contamination within the bermed area. Benzene concentrations in soil samples from these locations were significantly lower than the concentrations found in soil samples from Locations 1, 3, and 6. BETX compounds other than benzene were also detected in most soil near the benzene line. Higher concentrations of ETX compounds occurred in soil at Locations 3, 5, 6, and 7. Concentrations of BETX compounds in soil were relatively low in the samples from Locations 2 and 4 which were located in the corners (northeast and southeast) of the 80s Tank Farm. Furthermore, soil contamination concentrations decreased with depth.

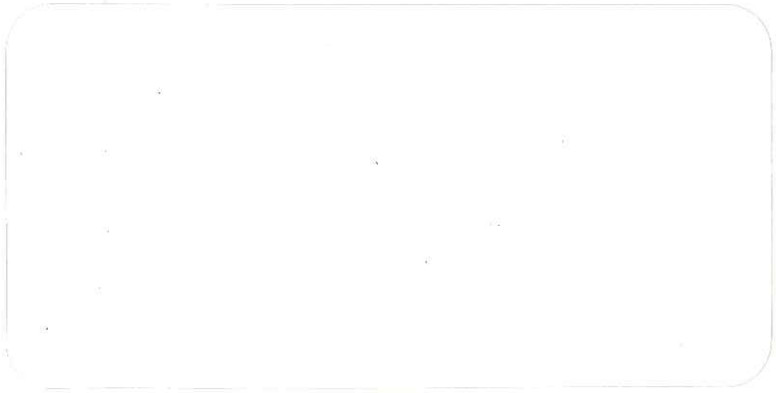
The concentration of benzene in groundwater ranged from 0.002 ppm (Location 4) to 500 ppm (Location 1). The highest concentrations of benzene in groundwater were detected in samples from Locations 1, 5, and 7. These locations also had relatively high levels of soil contamination. At Locations 3 and 6 (both in the center cell of the bermed area) groundwater did not accumulate during probing. BETX

compounds other than benzene were also detected in most groundwater samples (except Location 2). Location 1 had the highest levels of benzene contamination in the groundwater. However, the concentrations of the ETX compounds at this location were not in the same proportion when compared to other groundwater sampling results.

During probing, some characteristics of the subsurface conditions beneath the 80s Tank Farm were observed. Generally, groundwater was encountered at a depth of 2 to 3 feet below the ground surface, except at Locations 3 and 6 where groundwater did not accumulate. Stained soil was observed and a hydrocarbon odor was smelled, or detected with air monitoring instruments, at most locations. A relatively tight cohesive layer comprised of silt and clay was encountered at many locations between 9 and 11 feet bgs. Soils immediately above this cohesive layer were stained and had a hydrocarbon odor. This cohesive layer may be inhibiting downward migration of contamination. There is some evidence that an LNAPL may be present on the groundwater in the vicinity of Location 1; however, attempts to verify the presence of an LNAPL were inconclusive (see Section 2.0). In addition, a sheen was observed on the groundwater sample at Location 7.

JACOBS

TES IV



JACOBS ENGINEERING GROUP INC.
ENVIRONMENTAL SYSTEMS DIVISION

IN ASSOCIATION WITH:
TETRA TECH
METCALF & EDDY
ICAIR LIFE SYSTEMS
KELLOGG CORPORATION
GEO/RESOURCE CONSULTANTS
BATTELLE PACIFIC NORTHWEST LABORATORIES
DEVELOPMENT PLANNING AND RESEARCH ASSOCIATES

ENVIRONMENTAL PROTECTION AGENCY
TECHNICAL ENFORCEMENT SUPPORT
AT HAZARDOUS WASTE SITES

TES IV
CONTRACT NO. 68-01-7351
WORK ASSIGNMENT NO. 201

RCRA FACILITY ASSESSMENT SAMPLING REPORT

CLARK OIL REFINERY
BLUE ISLAND, ILLINOIS

EPA REGION V

JACOBS ENGINEERING GROUP, INC.
PROJECT NO. 05-B201-00

REPORT PREPARED BY:

METCALF & EDDY, INC.
85 WEST ALGONQUIN ROAD, SUITE 500
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JANUARY 1988

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SECTION 1
INTRODUCTION

1.1 SCOPE OW WORK

Metcalf & Eddy, Incorporated (M&E) was issued a work assignment (WS #201) under the Technical Enforcement Support (TES) IV contract (EPA #68017351) to perform RCRA Facility Assessment (RFA) sampling at Clark Oil, Blue Island Refinery, Blue Island, Illinois. Due to the nature of the material handled onsite, this work assignment was issued to iedntify whether Clark Oil does or does not store or treat hazardous waste that is subject to RCRA permitting requirements.

1.2 SITE BACKGROUND

Clark Oil and Refining Company is located in Blue Island, Illinois. It is a typical Oil Refinery with the convential process units. The facility is a generator of hazardous wastes only. According to information provided by the facility all the listed refinery waste streams are recycled to the coker unit, except the DAF sludge, which is sent out to a RCRA approved hazardous waste landfill. There are two storage tanks 35-1 and 35-2. The solids formed in these tanks are shipped of site as KO52 wastes.

Clark Oil generates API separator sludge - K051, DAF float - K049, and leaded tank bottoms - K052. In the refinery all the above wastes end up in API separator and in their Wastewater Treatment System. The sludge generated in API separator is a listed hazardous waste, and any supernatant derived form their sludge thickening operation is also a hazardous waste due to "derived form" and "mixture" rules. A "pit" receives the API separator sludge, from where the supernatant is recycled to the API separator, and the sludge is pumped to a coker together with the oily skimmings of the API separator and pit.

Clark Oil claims that this acid is neutralized in the chemical process itself and therefore they do not generate or treat hazardous waste in the Alkyl unit. The facility has a spent caustic tank, and several slop oil tanks that Clark claims as a continuous operating tanks, not used for storage for more than 90 days, therefore not subject to RCRA permitting requirements.

1.3 PROJECT APPROACH

The RFA work assignment consisted of three tasks. Each of these tasks are briefly described below:

TASK 1: Field Sampling

Surface water and sludge samples were collected at onsite locations to help characterize potential contamination the facility. As samples were collected, they were preserved according to U.S. EPA procedures which are described in the February 10, 1987 Quality Assurance Project Plan for the RFA project. All sampling locations were identified by the U.S. EPA Primary Contact, Lily Herskovits.

TASK 2: Sample Shipment

All samples collected were sent to designated Contract Laboratory Program (CLP) Laboratories. Samples collected for organics analysis were sent ot S-Cubed in San Diego, California. Samples collected for EP Toxicity (Metals), Oil and Grease, TSS, and Sulfides analysis were sent to Centex Analytical Services in Salem, Virginia. Standard U.S. EPA sample handling protocols were followed for sample preservation, packaging and shipment.

TASK 3: Sampling Report

This written report is being submitted to the U.S. EPA upon completion of the sampling activities.

SECTION 2
FIELD ACTIVITIES

2.1 INTRODUCTION

On December 2, 3 and 4, M&E representatives Bob Schoepke, Margaret Murdock and Gary Kruger collected a total of 18 onsite surface water samples at the Clark Oil, Blue Island Refinery, Blue Island, Illinois (See Table 1 and Figure 1). Access to the site and all sampling locations was obtained by the U.S. EPA Primary Contact Dr. Lily Herskovitz. All sampling depths and parameter analyses requested were finalized onsite by Dr. Herskovitz.

Prior to sampling, Mr. Tom Freily, of Clark Blue Island Refinery, requested split samples from all proposed sampling locations. Clark Oil also requested that M&E supply the sample bottles. M&E representatives informed Clark Oil that this would not be possible. The request for sample splitting was agreed to by Dr. Herskovitz of the U.S. EPA and M&E.

On the morning of December 2, 1987, John Bermbem, Tom Freily and Stafford Jacques of Clark Oil, Dr. Lily Herskovitz of the U.S. EPA and the M&E representatives met to discuss sampling plans and locations.

During the course of the meeting and a visual inspection of the facility, it was decided that water samples would be collected at the influent pipe to the API Separator, Tank 63, and the acid neutralization tank (also called the caustic tank). In addition, sludge samples would be collected form the bottom of the API separator and the bottom of the DAF sump. Composite samples from all locations would be collected three times daily on 12-2-87, 12-3-87, and 12-4-87.

Clark Oil requested that samples taken from tank 603 and the acid neutralization tank be collected by Clark Oil Operators for safety reasons. This request was agreed to by Dr. Herskovitz and the M&E representatives.

2.2 FIELD INVESTIGATION

2.2.1 Surface Water Samples

Three composite surface water samples were collected on December 2, 3 and 4 1987. Composite samples were collected form an influent pipe to the API separator, tank 63, and the acid neutralization tank.

API separator influent samples S72, S64, and S59 were collected by opening a valve on the influent pipe and filling the bottles directly from the valve. The bottles were filled to one-third capacity during each sampling event during the day. At the end of the day, the sample bottles would contain a daily composite sample. Samples for volatile organic analysis were filled at the end of each day from a daily composite sample.

A triple volume of surface water was collected at this location to be used as matrix spike and matrix spike duplicate (per instructions on U.S. EPA form 2075-7 (8-87)).

API separator return flow samples S60 was collected form Tank 63 on December 2, 1987. Samples S65 and S73 were collected the following two days from tank 65. The samples from both tanks were collected by directly filling the sample bottles form a valve on the tank. All API separator return flow samples were collected by a Clark Oil operator under M&¯ representative supervision. The samples were composited in the same manner as the API separator influent samples.

Caustic tank samples S61, S66, and S74 were collected by opening a valve and directly filling the sample bottles. All caustic tank were collected by a Clark Oil operator under M&E representative supervision. The samples were composited in the same manner as the API separator influent and return flow samples.

Field blanks S69, S70, and S71 were collected each day by directly filling the sample bottles with distilled water.

The water samples from the caustic tank and the field blanks were submitted for full HSL organics analysis only. The water samples from the API separator influent and return flow were submitted for full HSL organics, TSS, sulfides, oil and grease analysis were preserved with sulfuric acid to a pH $<$ 2. Samples for sulfide analysis were preserved with 40 drops of 2N zinc acetate and sodium hydroxide to a pH of $>$ 9. All water samples were iced to 4^{o}C.

2.2.2 Sludge Samples

Two composite sludge samples were collected each day. The samples were composited in the same manner as the water samples.

The API separator sludge samples S62, S67, and S75 were collected from the bottom of the separator using a long-handled stainless steel ladle. The samples were poured directly form the ladle into the sample containers.

A double volume of sludge was collected on December 3, 1987 at this location to be used as a matrix spike (per instructions on U.S. EPA form 207S-7 (8-87)).

The DAF sump sludge samples S63, S68 and S76 were collected form the sump bottom in the same manner as the separator sludge samples. The last third of sample S63 was collected from the overhead conical bottom tank per Dr. Herskovitz request.

All sludge samples were submitted for EP - Toxicity metals analysis.

All equipment used in sample collection was decontaminated after each use. Equipment decontamination consisted of an Alconox soap wash, a distilled water rinse and an isopropanol rinse. All equipment was allowed to air dry.

TABLE 1

SAMPLE LOCATIONS

STATION	DESCRIPTION
S72	API Separator Influent Water, 12-2-87
S64	API Separator Influent Water, 12-3-87
S59	API Separator Influent Water, 12-4-87
S60	API Separator Return Flow Water, Tank 63, 12-2-87
S65	API Separator Return flow Water, Tank 65, 12-3-87
S73	API Separator Return Flow Water, Tank 65, 12-4-87
S61	Acid Neutralization/Caustic Tank Water, 12-2-87
S66	Acid Neutralization/Caustic Tank Water, 12-3-87
S74	Acid Neutralization/Caustic Tank Water, 12-4-87
S62	API Separator Bottom Sludge, 12-2-87
S67	API Separator Bottom Sludge, 12-4-87
S63	DAF Sump Sludge and Overhead Conical Bottom Tank, 12-2-87
S68	DAF Sump Sludge, 12-4-87
S76	DAF Sump Sludge, 12-4-87
S69	Field Blank, 12-2-87
S70	Field Blank, 12-3-87
S71	Field Blank, 12-4-87

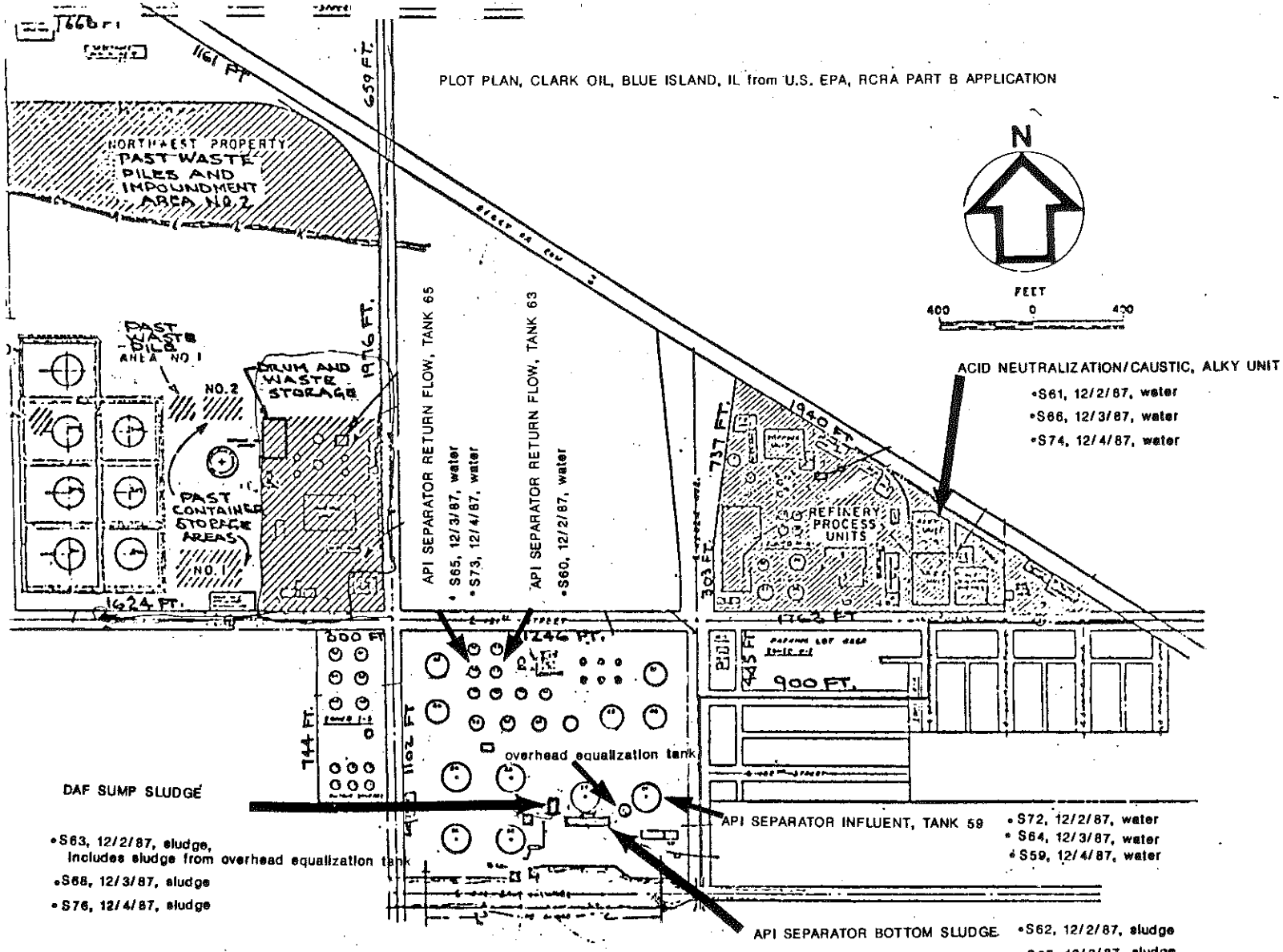

FIGURE 1 – SAMPLING LOCATIONS MAP

APPENDIX A

Field Log Sheets

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: API separator influent, 12-4-87, collected from API separator influent pipe.

Field Sample Number: S59

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: The sample was collected directly from a valve on the influent pipe. The bottles were filled to 1/3 capacity three times daily.

Date and Time of Collection: 12-4-87; 0920, 1200 and 1500

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representative. U.S. EPA samples shipped to CLP on 12-4-87. Requested analysis for HSL organics, VOAs, Oil and grease, sulfides, EP-toxicity and TSS. Oil and grease sample was preserved to pH $<$ 2.0 with H_2SO_4. Sulfide sample was preserved with 2N zinc acetate and NaOH to a pH $>$ 9.0.

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: API separator return flow, 12-2-87 sample collected from tank 63.

Field Sample Number: S60

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: Sample was collected from a valve in the middle of tank 63 by a Clark Oil operator under M&E supervision. The bottles were filled to 1/3 capacity three times daily. The composite sample was collected at 1145, 1430 and 1615.

Date and Time of Collection: 12-2-87, 1145, 1430 and 1615

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples shipped to CLP on 12-2-87. Requested analysis for full HSL organics, oil and grease, TSS sulfides and EP toxicity (metals). The oil and grease sample was preserved with H_2SO_4 to a pH $<$ 2. The sulfide sample was preserved with 2N zinc acetate and NaOH to a pH $>$ 9.

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: Caustic tank, 12-2-87 sample collected from acid neutralization tank.

Field Sample Number: S61

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: Sample was collected from a valve in the neutralization tank by the Clark Oil operator under M&E supervision. The bottles were filled to 1/3 capacity three times daily. The composite sample was collected at 1115, 1415 and 1605.

Date and Time of Collection: 12-2-87, 1115, 1415, 1605

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples shipped to CLP on 12-2-87. requested analysis for full HSL organics.

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: API separator sludge, 12-2-87 sample collected from bottom of API separator.

Field Sample Number: S62

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: Sample was collected from the bottom of the API separator using a long-handled stainless steel ladle. The bottles were filled to 1/3 capacity three times daily. The composite sample was collected at 1120, 1430 and 1605.

Date and Time of Collection: 12-2-87, 1120, 1430 and 1605

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples shipped to CLP on 12-2-87. Requested analysis for EP toxicity (metals).

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: DAF sump sludge, 12-2-87 sample collected from the bottom of the DAF sump.

Field Sample Number: S63

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: The sample was collected from the bottom of the DAF sump using a long-handled stainless steel ladle. The bottle was filled to 1/3 capacity three times daily. The sample was composited at 1125, 1435 and 1615.

Date and Time of Collection: 12-2-87, 1125, 1435 and 1615

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples shipped to CLP on 12-2-87 requested analysis for EP toxicity (metals).

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: API separator influent, 12-3-87, sample collected from API separator influent pipe.

Field Sample Number: S64

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: The sample was collected directly from a valve on the influent pipe. The sample bottles were filled to 1/3 capacity, three times daily. The composite sample was collected at 0930, 1145 and 1510.

Date and Time of Collection: 12-3-87, 0930, 1145 and 1510

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples shipped to CLP on 12-3-87. Requested analysis for full HSL organics, oil and grease, TSS, sulfides and EP Toxicity (metals). Oil and grease samples were preserved with H_2SO_4 to a pH of < 2. The sulfide sample was preserved with 2N zinc acetate and NaOH to a pH > 9.

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: API separator return flow, 12-3-87 sample collected from tank 65.

Field Sample Number: S65

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: Sample was collected from a valve in the middle of tank 65 by a Clark Oil operator under M&E supervision. The bottles were filled to 1/3 capacity three times daily. The composite sample was collected at 0950, 1205 and 1510.

Date and Time of Collection: 12-3-87, 0950, 1205 and 1510

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples shipped to CLP on 12-3-87. Requested analysis for full HSL organics, oil and grease, TSS, sulfides and EP toxicity (metals). The oil and grease sample was preserved with H_2SO_4 to a pH of < 2.

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: Caustic tank, 12-3-87. Sample collected from acid neutralization tank.

Field Sample Number: S66

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: Sample was collected from a valve in the neutralization tank by a Clark Oil operator under M&E supervision. The bottles were filled to 1/3 capacity three times daily. The composite sample was collected at 0940, 1200 and 1520.

Date and Time of Collection: 12-3-87, 0940, 1200 and 1520

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples shipped to CLP on 12-3-87. Requested analysis for full HSL organics.

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: API separator sludge, 12-3-87. Sample collected from bottom of API separator.

Field Sample Number: S67

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: Sample was collected from the bottom of The API separator using a long-handled stainless steel ladle. The bottle was filled to 1/3 capacity, three times daily. The composite sample was collected at 0940, 1150 and 1515.

Date and Time of Collection: 12-3-87, 0940, 1150 and 1515

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples shipped to CLP on 12-3-87. Requested analysis for EP toxicity (metals).

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: DAF sump sludge, 12-3-87 sample collected from the bottom of the DAF sump.

Field Sample Number: S68

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: The sample was collected from the bottom of the DAF sump using a long-handled stainless steel ladle. The sample bottle was filled to 1/3 capacity, three times daily. The sample was composited at 0950, 1155 and 1520.

Date and Time of Collection: 12-3-87, 0950, 1155 and 1520

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples shipped to CLP on 12-3-87. Requested analysis for EP toxicity (metals).

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: Field blank collected near API separator.

Field Sample Number: S69

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: Filled sample bottles directly from distilled water bottle.

Date and Time of Collection: 12-2-87, 1500

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples shipped to CLP on 12-2-87. Requested analysis for full HSL organics.

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: Field Blank, 12-3-87, collected near the API separator.

Field Sample Number: S70

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: Filled sample bottles directly from the distilled water bottle. The field blank was preserved in the same manner as the samples.

Date and Time of Collection: 12-3-87; 1000

Results of any Field Measurements Made:

Observations and Comments: This sample was not split with Clark Oil representatives. U.S. EPA samples were shipped to CLP labs on 12-3-87. Requested analysis for HSL organics and VOAs.

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: API separator influent, 12-2-87, collected from API separator influent pipe.

Field Sample Number: S71

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: The sample was collected directly from a value on the influent pipe. The bottles were filled to 1/3 capacity, three times daily. The composite sample was collected at 1115, 1420 and 1600.

Date and Time of Collection: 12-2-87, 1115, 1420 and 1600

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples were shipped to CLP labs on 12-2-87. Requested analysis for full HSL organics, oil and grease, sulfides, total suspended solids and EP toxicity. The oil and grease sample was preserved with H_2SO_4 to a pH $<$ 2. The sulfide sample was preserved with 2N zinc acetate and NaOH to a pH $>$ 9.

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: API separator influent, 12-2-87, collected from API separator influent pipe.

Field Sample Number: S72

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: The sample was collected directly from a value on the influent pipe. The bottles were filled to 1/3 capacity, three times daily. The composite sample was collected at 1115, 1420 and 1600.

Date and Time of Collection: 12-2-87, 1115, 1420 and 1600

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples were shipped to CLP labs on 12-2-87. Requested analysis for full HSL organics, oil and grease, sulfides, total suspended solids and EP toxicity. The oil and grease sample was preserved with H_2SO_4 to a pH $<$ 2. The sulfide sample was preserved with 2N zinc acetate and NaOH to a pH $>$ 9.

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: API separator return flow, 12-4-87, collected at tank 65.

Field Sample Number: S73

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: The sample was collected directly from a valve on tank 65 by a Clark Oil operator under M&E supervision. The bottles were filled to 1/3 capacity three times daily.

Date and Time of Collection: 12-4-87; 0910, 1210 and 1500

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples shipped to CLP on 12-4-87. Requested analysis for HSL organics, VOAs, Oil and grease. Sulfides, EP-toxicity and TSS. Oil and grease sample was presented to pH $<$ 2.0 with H_2SO_4. Sulfide samples was preserved with 2N zinc acetate and NaOH to a pH $>$ 9.0.

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: Caustic tank, 12-4-87 sample collected from acid neutralization tank.

Field Sample Number: S74

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: Sample collected from a valve on the caustic tank by a Clark Oil operator under M&E supervision. The sample jars were filled to 1/3 capacity three times daily.

Date and Time of Collection: 12-4-87; 0925, 1200 and 1510

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples shipped to CLP on 12-4-87. Requested analysis for HSL organics and VOAs.

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: API separator sludge, 12-4-87, collected from the bottom of the API separator.

Field Sample Number: S75

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: Sludge sample was collected from the bottom of the API separator using a long-handled stainless steel ladle. The sample was poured directly into the sample jar. The jar was filled with 1/3 of its capacity three times daily.

Date and Time of Collection: 12-4-87; 0925, 1205 and 1505

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples shipped to CLP on 12-4-87. Requested analysis for EP-toxicity.

NAME (Printed): Robert Schoepke

Signature:

FIELD LOG SHEET

Facility Name: Clark Oil, Blue Island Refinery

Facility Address: P.O. Box 297 Blue Island, IL 60406

Location and Description of Sampling Point: DAF sludge, 12-4-87, collected from the DAF sump.

Field Sample Number: S76

Purpose of Sampling: To determine if the return water to the API separator and the spent acid in the HF Alkylation unit are hazardous wastes that require a RCRA permit.

Type of Waste: API separator sludge - K051, DAF float - K049 and leaded tank bottoms - K052.

Process (if known) Producing Waste: Oil Refining

Suspected Composition, Including Concentrations (if known):

Sampling Methodology: Sludge sample was collected from the bottom of the sump with a long-handled stainless steel ladle. The sample was poured directly into the sample jar. The jar was filled with 1/3 of its capacity three times daily.

Date and Time of Collection: 12-4-87; 0930, 1210 and 1510

Results of any Field Measurements Made:

Observations and Comments: Samples were split with Clark Oil representatives. U.S. EPA samples shipped to CLP labs on 12-4-87. Requested analysis for EP toxicity.

NAME (Printed): Robert Schoepke

Signature:

APPENDIX B

Chain of Custody Forms

ENVIR NTAL PROTECTION AGENCY
Office of Enforcement

ION 5
230 South Dearborn Street
Chicago, Illinois 60604

CHAIN OF CUSTODY RECORD

PROJ. NO. 88IG01 ~~8823 MBM~~ | PROJECT NAME: CLARK OIL & REFINING

SAMPLERS: (Signature) R. Schuyler / Harry W. Kruger / Margaret Murdock

Low Concentrations
Case # 8624

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOLATILE ORGANICS	EXTRACTABLES PRIORITY Pollutants	Pesticides			CLP#	REMARKS TAT#
S72	12/2/87	1600	X		API Separator Influent	2x40mL	X					EP 742	529431 5-29401
S72	12/2/87	1600	X		" "	2x40ml	X					EP 742	5-29407 5-29437
S72	12/2/87	1600	X		" "	2x40ml	X					EP 742	5-29413 5-29439
S72	12/2/87	1600	X		" "	2x80oz		X	X	X		EP 742	5-29402 5-29432
S72	12/2/87	1600	X		" "	2x80oz		X	X	X		EP 742	5-29408 5-29438
S72	12/2/87	1600	X		" "	2x80oz		X	X	X		EP 742	5-29440 5-29414
S60	12-2-87	1615	X		API SEPERATOR RETURN FLOW	2x40ml	X					EP 734	5-29346 5-110367
S60	12-2-87	1615	X		" "	2x80oz		X	X	X		EP 734	5-29347 5-110368
S61	12-2-87	1605	X		CAUSTIC TANK	2x40ml	X					EP 735	5-29344 5-110373
S61	12-2-87	1605	X		" "	2x80oz		X	X	X		EP 735	5-29345 5-110374
~~S69~~	~~12-2-87~~	~~1603~~	X		~~FIELD~~								

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
R. Schuyler	12-2-87 1700				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: FEDERAL EXPRESS Airbill #6507417771 shipped to S-cubed. Custody Seals: 11679, 11670	

Distribution: White — Accompanies Shipment; Pink — Coordinator Field Files; Yellow — Laboratory File

5- 15701

ENVIRON AL PROTECTION AGENCY
Office of Enforcement

RE JN 5
230 South Dearborn Street
Chicago, Illinois 60604

CHAIN OF CUSTODY RECORD

PROJ. NO. 88IG01 ~~8603~~ | PROJECT NAME CLARK OIL & REFINING

SAMPLERS: (Signature) R. Schroeder, Henry W. Yeager, Margaret Murdock

Low Concentrations
Case # 8624

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Volatile organics	Extractables Priority Pollutants	Pesticides	REMARKS CLP #	TAT #
~~S72~~	~~12-2-87~~	~~1600~~	X		~~API SEPARATOR~~						
S69	12-2-87	1500		X	FIELD BLANK	2x40mL	X			EP739	S-110396 S-29342
S69	12-2-87	1500		X	"	2x1000		X X X		EP739	S-110398 S-29343

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
R. A. Schroeder	12-2-87 1700				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	Federal Express Airbill # 6507417990 Shipped to S-Cubed 11674, 11673 Custody Seals:

Distribution: White — Accompanies Shipment; Pink — Coordinator Field Files; Yellow — Laboratory File

5-00100

ENVIRONM[illegible]L PROTECTION AGENCY
Office of Enforcement

REL[illegible] V 6
230 South Dearborn Street
Chicago, Illinois 60604

CHAIN OF CUSTODY RECORD

wam 12/2/87 wam 12/3/87

PROJ. NO.	PROJECT NAME	NO. OF CONTAINERS
88J601	CLARK OIL AND REFINING	

SAMPLERS: *(Signature)*
Gary W. Krueger / R. Schroeder / Margaret Murdock

Low Concentrations
Case # 8624
SAS # 3504-E

REMARKS

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	~~OIL & Grease~~	~~EP Toxicity~~	TSS	SULFIDES	EP Toxicity	tag # ~~SAS # wam~~	~~wam~~
S72	12/2/87	1600	X		API Separator Influent	1 x 1l			X			5-29406	
S72	12/2/87	1600	X		" " "	1 x 1l			X			5-29412	
S72	12/2/87	1600	X		" " "	1 x 1l			X			5-29418	
S72	12/2/87	1600	X		" " "	1 x 1l				X		5-29404	
S72	12/2/87	1600	X		" " "	1 x 1l				X		5-29410	
S72	12/2/87	1600	X		" " "	1 x 1l				X		5-29416	
S60	12/2/87	1650	X		API Separator Return Flow	1 x 1l			X			5-110372	
S60	12/2/87	1650	X		" " " "	1 x 1l				X		5-110370	
S62	12/2/87	1605	X		API Separator Sludge	1 x 8oz					X	5-110375	
S63	12/2/87	1615	X		~~DAF~~ Sludge	1 x 8oz					X	5-110377	

ADVISED 12/3/87 WAM WITSMO Carol Schaefer

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
R. Schroeder	12-2-87 1700				
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks	
					FED EX AIRBILL #6507417965 SHIPPED TO CENTEC ANALYTICAL SERVICES Chain of custody seals 11679 AND 11677

Distribution: White — Accompanies Shipment; Pink — Coordinator Field Files; Yellow — Laboratory File

5-15703

ENVIRON. . AL PROTECTION AGENCY
Office of Enforcement

REG. N 5
230 South Dearborn Street
Chicago, Illinois 60604

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
88J601	CLARK OIL & REFINING

SAMPLERS: (Signature)
R. Schaefer / Hans W. Kruger / Margaret Murdock

Low Concentrations
Case # 8624
SAS # 3504-E
REMARKS

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Oil & Grease	EP Toxicity					tag #
S72	12/2/87	1600	X		API Separator Influent	1x80z	X						5-29403
S72	12/2/87	1600	X		API Separator Influent	1x80z	X						5-29409
S72	12/2/87	1600	X		" "	1x80z	X						5-29415
S72	12/2/87	1600	X		" "	1x80z	~~X~~ MAM	X					5-29405
S72	12/2/87	1600	X		" "	1x80z	~~X~~ MAM	X					5-29411
S72	12/2/87	1600	X		" "	1x80z	~~X~~ MAM	X					5-29417
S60	12/2/87	1615	X		API Separator Return Flow	1x80z	X						5-110369
S60	12/2/87	1615	X		" "	1x80z		X					5-110371
~~S61~~ MAM													
~~S63~~	~~12/2/87~~	~~1605~~	X		~~API Separator~~ Sludge	1x80z	MAM 12/3/87						

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
R. Schaefer	12-2-87 1700				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
				FED EX AIRBILL # 6507417976 SHIPPED to CENTEC ANALYTICAL SERVICES CUSTODY SEALS 11675, 11676	

Distribution: White — Accompanies Shipment; Pink — Coordinator Field Files; Yellow — Laboratory File

5- 15727

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 5
230 South Dearborn Street
Chicago, Illinois 60604

CHAIN OF CUSTODY RECORD

PROJ. NO.: 881601 | PROJECT NAME: CLARK OIL AND REFINING

SAMPLERS: (Signature) R. Schaefer / Gary W. Zuzga / Margaret Murdock

Low Concentrations
Case # 8624
SAS # 3584-E

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	OIL and GREASE	EP TOXICITY	TSS	SULFIDES			REMARKS (tag #)
S64	12/3/87	1510	X		API Separator Influent	1x80z	X						5-110380
S64	12/3/87	1510	X		" "	1x80z		X					5-110382
S64	12/3/87	1510	X		" "	1x1l			X				5-110383
S64	12/3/87	1510	X		" "	1x1l				X			5-110381
S67	12/3/87	1515	X		API Separator Sludge	1x80z		X					5-110393
S67	12/3/87	1515	X		" "	1x80z		X					5-110394
S68	12/3/87	1520	X		DAF Sludge	1x80z		X					5-110395
S65	12/3/87	1510	X		API Return Flow	1x80z	X						5-110386
S65	12/3/87	1510	X		" "	1x80z		X					5-110388
S65	12/3/87	1510	X		" "	1x1l			X				5-110389
S65	12/3/87	1510	X		" "	1x1l				X			5-110387
					SECOND SHIPMENT IN A SERIES OF THREE								

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
R. Schaefer	12-3-87 1700				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
				FED EX AIRBILL # 6507418013 SHIPPED TO CENTEC ANALYTICAL SERVICES CUSTODY SEALS 11670, 11669	

Distribution: White — Accompanies Shipment; Pink — Coordinator Field Files; Yellow — Laboratory File

5- 15706

ENVIRON[illegible]L PROTECTION AGENCY
Office of Enforcement

RE[illegible] 5
230 South Dearborn Street
Chicago, Illinois 60604

CHAIN OF CUSTODY RECORD

PROJ. NO.: 88J601
PROJECT NAME: CLARK OIL and REFINING
SAMPLERS: (Signature) R. Schoepke / Mary V. Keyes / Margaret Murdock

LOW CONCENTRATIONS
Case # 8624

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOLATILE ORG.	ORGANICS GC/MS	PRIORITY POLLUTANTS	PESTICIDES	REMARKS OTR#	REMARKS TAG#
S64	12-3-87		X		API SEP INFLUENT	2x40ML	X				EP736	5-110378 5-29441
S64	12-3-87		X		"	2x80oz		X	X	X	EP736	5-110379 5-29442
S65	12-3-87		X		API SEP. RETURN FLOW	2x40ML	X				EP737	5-110384 5-29435
S65	12-3-87		X		"	2x80oz		X	X	X	EP737	5-110385 5-29436
S66	12-3-87		X		CAUSTIC TANK	2x40ML	X				EP738	5-110390 5-29433
S66	12-3-87		X		"	2x80oz		X	X	X	EP738	5-110391 5-29434
S70	12-3-87			X	FIELD BLANK	2x40ML	X				EP740	5-110399 5-29348
S70	12-3-87			X	"	2x80oz		X	X	X	EP740	5-110400 5-29349

* SECOND IN A SERIES OF THREE SHIPMENTS

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
R. Schoepke	12-3-87 / 1700				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
					FED EX AIRBILL #6507418035 SHIPPED TO S-CUBED
					CUSTODY SEALS: #11672, 11671

Distribution: White — Accompanies Shipment; Pink — Coordinator Field Files; Yellow — Laboratory File

5- 15704

ENVIRC TAL PROTECTION AGENCY
Office of Enforcement

ON 5
230 South Dearborn Street
Chicago, Illinois 60604

CHAIN OF CUSTODY RECORD

PROJ. NO.: 88J601
PROJECT NAME: CLARK OIL AND REFINING

SAMPLERS: (Signature) R. Schragl / Harry W. Kreyer / Margaret Allenbeck

Low Concentrations Case # 8624

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Volatile Organics	Organics GC/MS	Priority Pollutants	Pesticides			REMARKS: OTR#	TAG#
S73	12-4-87	1500	X		API SEP. RETURN FLOW	2×40ml	X						EP734	S-29419, S-29445
S73	12-4-87	1500	X		" "	2×80oz		X	X	X			EP734	S-29420, S-29446
S59	12-4-87	1500	X		API SEP. INFLUENT	2×40ml	X						EP733	S-110359, S-29447
S59	12-4-87	1500	X		" "	2×80oz		X	X	X			EP733	S-110361/S-29448
S74	12-4-87	1510	X		CAUSTIC TANK	2×40ml	X						EP743	S-29425, S-29443
S74	12-4-87	1510	X		" "	2×80oz		X	X	X			EP743	S-29426, S-29444
S71	12-4-87	0935		X	FIELD BLANK	2×40ml	X						EP741	S-80573, S-29450
S71	12-4-87	0935		X	" "	2×80oz		X	X	X			EP741	S-80574, S-28749
					*LAST SHIPMENT IN A SERIES OF THREE									

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
R. Schragl	12-4-87 1700				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
				FED EX AIRBILL #6507417932 SHIPPED TO S-CUBED custody seals: 11667 + 11668

Distribution: White — Accompanies Shipment; Pink — Coordinator Field Files; Yellow — Laboratory File

5- 15709

ENVIROI AL PROTECTION AGENCY
Office of Enforcement

RE N 5
230 South Dearborn Street
Chicago, Illinois 60604

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
88IG01	CLARK OIL and REFINING

SAMPLERS: (Signature) Gary W. Kruse / R. Schuck / Margaret A. Murdock

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	OIL & Grease	EP Toxicity	TCL	Sulfides			REMARKS
													Low Concentrations Case # 8624 SAS # 3504-E
S73	12/4/87	1500	X		API SEP. RETURN FLOW	1 X 80z	X						5-29421
S73	12/4/87	1500	X		" " " "	1 X 1 l				X			5-29422
S73	12/4/87	1500	X		" " " "	1 X 80z		X					5-29423
S73	12/4/87	1500	X		" " " "	1 X 1 l			X				5-29424
S59	12/4/87	1500	X		API SEP. INFLUENT	1 X 80z	X						5-110363
S59	12/4/87	1500	X		" " "	1 X 1 l				X			5-110364
S59	12/4/87	1500	X		" " "	1 X 80z		X					5-110365
S59	12/4/87	1500	X		" " "	1 X 1 l			X				5-110366
S75	12/4/87	1505	X		API SEP. SLUDGE	1 X 8 oz		X					5-29427
S76	12/4/87	1510	X		DAF SLUDGE	1 X 8 oz		X					5-29429
~~S71~~	~~12/4/87~~		X	#X									
					*LAST SHIPMENT IN A SERIES OF THREE.								

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
R. Schuck	12-4-87 1700				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
				FED EX AIRBILL #650741800? SHIPPED to CENTEC ANALYTICAL SERVICES Custody SEALS 11665 + 11666	

Distribution: White — Accompanies Shipment; Pink — Coordinator Field Files; Yellow — Laboratory File

5-15710

APPENDIX C

Organic Traffic Reports

USEPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA, VA 22313
703/557-2490, FTS-557-2490

CASE NO: 8624 | SAS NO: (IF APPLICABLE) 3544-E

ORGANIC TRAFFIC REPORT
(FOR CLP USE ONLY)

TYPE OF ACTIVITY (CIRCLE ONE) ①
SUPERFUND—PA SI ESI RIFS RD RA ER
NPLD O&M OTHER _____
NON-SUPERFUND— RCRA PROGRAM

SITE NAME: CLARK OIL AND REFINING
CITY, STATE: BLUE ISLAND, IL
SITE SPILL ID: _____

REGION NO: V ②
SAMPLING COMPANY: Metcalf & Eddy
SAMPLER: (NAME) Margaret Murdock

SHIP TO: ③
S-Cubed
3398 Carmel Mtn Rd
San Diego, CA 92121
ATTN: Elaine Walters

SAMPLING DATE: 12/2/87 ④
BEGIN: 12-2-87 END: 12-2-87

DATE SHIPPED: _____ CARRIER: FE ⑤
AIRBILL NO: 650741 7991

SAMPLE DESCRIPTION ⑥
(ENTER IN BOX A)
1. SURFACE WATER
2. GROUND WATER
3. LEACHATE
4. SOIL
5. SEDIMENT
6. OIL (SAS)
7. WASTE (SAS)

TRIPLE VOLUME REQUIRED FOR MATRIX SPIKE/DUPLICATE AQUEOUS SAMPLE

SHIP MEDIUM AND HIGH CONCENTRATION SAMPLES IN PAINT CANS

SEE REVERSE FOR ADDITIONAL INSTRUCTIONS

organic traffic number same as CLP SAMPLE NUMBER (FROM LABELS)

Ⓐ SAMPLE DESCRIPTION (FROM BOX 1) 1 2 3 4 5 6 7	Ⓑ CONCENTRATION L = LOW/MED, H = HIGH (SAS)	Ⓒ RAS ANALYSIS: VOLATILE	BASE/NEUT /ACID	PESTICIDE /PCB's		Ⓓ SPECIAL HANDLING	Ⓔ STATION LOCATION
EP 742	1	L	X	X	X			S72
EP 734	1	L	X	X	X			S60
EP 7345 MS	1	L	X	X	X			S61
RBS EP 739	3	L	X	X	X		RINSATE	S69

EPA Form 2075-7 (8-87)

WHITE — SMO COPY PINK — CLIENT COPY WHITE — LAB COPY FOR RETURN TO SMO YELLOW — LAB COPY

SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA, VA 22313
703/557-2490 FTS-557-2490

CASE NO: 8624 (IF APPLICABLE)

ORGANIC TRAFFIC REPORT

(FOR CLP USE ONLY)

TYPE OF ACTIVITY (CIRCLE ONE) ①
SUPERFUND—PA SI ESI RIFS RD RA ER
NPLD O&M OTHER ____
NON-SUPERFUND— RCRA PROGRAM

SITE NAME: CLARK OIL And REFINING
CITY, STATE: Blue Island, IL
SITE SPILL ID: ____

REGION NO: V
SAMPLING COMPANY ② Metcalf & Eddy
SAMPLER: (NAME) Margaret Murdock

SHIP TO: ③
S-cubed
3398 Carmel Mtn Rd
San Diego, CA 92121

ATTN: ELAINE WALTERS

SAMPLING DATE: 12/2/87 ④
BEGIN: 12-2-87 END: 12-2-87

DATE SHIPPED: ____ CARRIER: FE ⑤
AIRBILL NO: 6507417980

SAMPLE DESCRIPTION ⑥
(ENTER IN BOX A)
1. SURFACE WATER
2. GROUND WATER
3. LEACHATE
4. SOIL
5. SEDIMENT
6. OIL (SAS)
7. WASTE (SAS)

TRIPLE VOLUME REQUIRED FOR MATRIX SPIKE/DUPLICATE AQUEOUS SAMPLE

SHIP MEDIUM AND HIGH CONCENTRATION SAMPLES IN PAINT CANS

SEE REVERSE FOR ADDITIONAL INSTRUCTIONS

CLP SAMPLE NUMBER (FROM LABELS)	Ⓐ SAMPLE DESCRIPTION (FROM BOX 1) 1 2 3 4 5 6 7	Ⓑ CONCENTRATION L = LOW/MED H = HIGH (SAS)	Ⓒ RAS ANALYSIS VOLATILE	BASE/NEUT /ACID	PESTICIDE /PCB's		Ⓓ SPECIAL HANDLING	Ⓔ STATION LOCATION
EP739	3	L	X	X	X		RINSATE	569

EPA Form 2075-7 (8-87)

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USEPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA, VA 22313
703/557-2490 FTS-557-2490

CASE NO: 8624 | SAS NO: 3504-E (IF APPLICABLE)

ORGANIC TRAFFIC REPORT
(FOR CLP USE ONLY)

TYPE OF ACTIVITY (CIRCLE ONE) ①
SUPERFUND—PA SI ESI RIFS RD RA ER
NPLD O&M OTHER _____
NON-SUPERFUND— RCRA PROGRAM

SITE NAME: CLARK OIL AND REFINING
CITY, STATE: Blue Island, IL
SITE SPILL ID:

REGION NO: V
SAMPLING COMPANY ② Metcalf Eddy
SAMPLER: (NAME) Margaret Murdock

SHIP TO: ③
S-Cubed
3398 Carmel Mtn Rd
San Diego, CA 92121
ATTN: ELAINE WALTERS

SAMPLING DATE: 12/3/87 ④
BEGIN: 12-3-87 END: 12-3-87

DATE SHIPPED: _____ CARRIER: FE ⑤
AIRBILL NO: 650741 8035

SAMPLE DESCRIPTION ⑥
(ENTER IN BOX A)
1. SURFACE WATER
2. GROUND WATER
3. LEACHATE
4. SOIL
5. SEDIMENT
6. OIL (SAS)
7. WASTE (SAS)

TRIPLE VOLUME REQUIRED FOR MATRIX SPIKE/DUPLICATE AQUEOUS SAMPLE

SHIP MEDIUM AND HIGH CONCENTRATION SAMPLES IN PAINT CANS

SEE REVERSE FOR ADDITIONAL INSTRUCTIONS

CLP SAMPLE NUMBER (FROM LABELS)	Ⓐ SAMPLE DESCRIPTION (FROM BOX 1) 1 2 3 4 5 6 7	Ⓑ CONCENTRATION L = LOW/MED. H = HIGH (SAS)	Ⓒ RAS ANALYSIS: VOLATILE	BASE/NEUT /ACID	PESTICIDE /PCB's		Ⓓ SPECIAL HANDLING	Ⓔ STATION LOCATION
EP736	1	L	X	X	X			564
EP737	1	L	X	X	X			565
EP738	1	L	X	X	X			566
EP740	3	L	X	X	X		RINSATE	570

EPA Form 2075-7 (8-87)

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SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA VA 22313
703/557-2490 FTS-557-2490

CASE NO: 8624 | SAS NO: 3504-E (IF APPLICABLE)

ORGANIC TRAFFIC REPORT
(FOR CLP USE ONLY)

TYPE OF ACTIVITY (CIRCLE ONE) ①
SUPERFUND—PA SI ESI RIFS RD RA ER
NPLD O&M OTHER ____
NON-SUPERFUND— RCRA PROGRAM

SITE NAME: CLARKOIL & REFINING
CITY, STATE: BLUE ISLAND, IL
SITE SPILL ID: ____

REGION NO: V
SAMPLING COMPANY ② METCALF & EDDY
SAMPLER: (NAME) Robert Schoepke

SHIP TO: ③ S-CUBED
3398 Carmel Mtn Rd
San Diego, CA 92121

ATTN: ELAINE WALTERS

SAMPLING DATE: 12/4/87 ④
BEGIN: 12-4-87 END: 12-4-87

DATE SHIPPED: ____ CARRIER: FE ⑤
AIRBILL NO: 6507417932

SAMPLE DESCRIPTION ⑥
(ENTER IN BOX A)
1. SURFACE WATER
2. GROUND WATER
3. LEACHATE
4. SOIL
5. SEDIMENT
6. OIL (SAS)
7. WASTE (SAS)

TRIPLE VOLUME REQUIRED FOR MATRIX SPIKE/DUPLICATE AQUEOUS SAMPLE

SHIP MEDIUM AND HIGH CONCENTRATION SAMPLES IN PAINT CANS

SEE REVERSE FOR ADDITIONAL INSTRUCTIONS

CLP SAMPLE NUMBER (FROM LABELS)	Ⓐ SAMPLE DESCRIPTION (FROM BOX 1) 1 2 3 4 5 6 7	Ⓑ CONCENTRATION L = LOW/MED H = HIGH (SAS)	Ⓒ RAS ANALYSIS VOLATILE	BASE/NEUT /ACID	PESTICIDE /PCB's		Ⓓ SPECIAL HANDLING	Ⓔ STATION LOCATION
EP734	1	L	X	X	X			573
EP733	1	L	X	X	X			559
EP743	1	L	X	X	X			574
EP741	3	L	X	X	X		RINSATE	571

EPA Form 2075-7 (8-87)

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APPENDIX D

SAS Packing Lists

U.S. ENVIRONMENTAL PROTECTION AGENCY
CLP Sample Management Office
P.O. Box 818 - Alexandria, Virginia 22313
Phone: 703/557-2490 - FTS/557-2490

SAS Number
3504 E

SPECIAL ANALYTICAL SERVICE
PACKING LIST

Sampling Office:	Sampling Date(s):	Ship To:	For Lab Use Only
V	12/2/87	CENTEC ANALYTICAL SERVICES 2160 INDUSTRIAL DR. SALEM, VA 24153	Date Samples Rec'd:
Sampling Contact: ROBERT SCHOEPKE (name)	Date Shipped: 12/2/87		Received By:
(312) 228-0900 (phone)	Site Name/Code:	Attn: SUZAN SHEPARD	

	Sample Numbers	Sample Description i.e., Analysis, Matrix, Concentration	Sample Condition on Receipt at Lab
1.	3504E01	88JG01572 - API SEPARATOR INFLUENT	
2.	3504 E02	88JG01560 - API SEPARATOR RETURN FLOW	
3.		ABOVE TWO (2) SAMPLES ARE	
4.		LOW LEVEL CONCENTRATION WATERS	
5.		FOR TSS + SULFIDES	
6.			
7.	3504E03	88JG01562 API Separator Sludge	
8.	3504E04	88JG01563 DAF SLUDGE	
9.		ABOVE two(2) samples are	
10.		LOW LEVEL concentration sludges	
11.		FOR EP-toxicity-metals	
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			

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U.S. ENVIRONMENTAL PROTECTION AGENCY
CLP Sample Management Office
P.O. Box 818 - Alexandria, Virginia 22313
Phone: 703/557-2490 - FTS/557-2490

SAS Number: 3504 E

SPECIAL ANALYTICAL SERVICE

PACKING LIST

Sampling Office:	Sampling Date(s):	Ship To:	For Lab Use Only
V	12/2/87	CENTEC ANALYTICAL SERVICES 2160 Industrial drive Salem, VA 24153	Date Samples Rec'd:
Sampling Contact:	Date Shipped:		
ROBERT SCHOEPKE (name)	12/2/87		Received By:
(312) 228-0900 (phone)	Site Name/Code:	Attn: SUSAN SHEPARD	

	Sample Numbers	Sample Description i.e., Analysis, Matrix, Concentration	Sample Condition on Receipt at Lab
1.	3504E01	88JE01572 API Separator Influent	
2.	3504E02	88JE01560 API Separator Return Flow	
3.			
4.		Above (2) samples are low concentration waters for oil & grease and EP toxicity - metals.	
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			

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U.S. ENVIRONMENTAL PROTECTION AGENCY
CLP Sample Management Office
P.O. Box 818 - Alexandria, Virginia 22313
Phone: 703/557-2490 - FTS/557-2490

SAS Number
3504 E

SPECIAL ANALYTICAL SERVICE

PACKING LIST

Sampling Office:	Sampling Date(s):	Ship To:	For Lab Use Only
V	12/3/87	CENTEC ANALYTICAL SERVICES 2160 INDUSTRIAL DRIVE SALEM, VA 24153	Date Samples Rec'd:
Sampling Contact: ROBERT SCHUEPKE (name)	Date Shipped: 12/3/87	Attn: SUSAN SHEPARD	Received By:
(312) 228-0900 (phone)	Site Name/Code:		

	Sample Numbers	Sample Description i.e., Analysis, Matrix, Concentration	Sample Condition on Receipt at Lab
1.	3504E01	88IG01564 API Separator Influent	
2.	3504E02	88IG01565 API Return Flow	
3.		Above two (2) samples are	
4.		Low Concentration waters	
5.		for oil & grease, EP-toxicity,	
6.		TSS and Sulfides	
7.	3504E03	88IG01567 API Separator Sludge	
8.	3504E04	88IG01568 DAF SLUDGE	
9.		Above two (2) samples are	
10.		Low Concentration sludges	
11.		for EP-toxicity	
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			

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U.S. ENVIRONMENTAL PROTECTION AGENCY
CLP Sample Management Office
P.O. Box 818 - Alexandria, Virginia 22313
Phone: 703/557-2490 - FTS/557-2490

SAS Number
3504 E

SPECIAL ANALYTICAL SERVICE

PACKING LIST

Sampling Office:	Sampling Date(s):	Ship To:	For Lab Use Only
V	12/4/87	CENTEC ANALYTICAL SRVCS. 2160 INDUSTRIAL DRIVE SALEM VA, 24153	Date Samples Rec'd:
Sampling Contact: ROBERT SCHOEPKE (name)	Date Shipped: 12/4/87		Received By:
(312) 228-0900 (phone)	Site Name/Code:	Attn: SUSAN SHEPARD	

	Sample Numbers	Sample Description i.e., Analysis, Matrix, Concentration	Sample Condition on Receipt at Lab
1.	3504 E 01	88J601573 - API RETURN FLOW	
2.	3504 E 02	88J601559 API SEPARATOR INFLUENT	
3.			
4.		THE ABOVE TWO LOW CONCENTRATION	
5.		WATER SAMPLES ARE TO BE	
6.		ANALYZED FOR OIL & GREASE, SULFIDES,	
7.		EP-TOX and TSS.	
8.			
9.	3504E03	88J601575 API SEPARATOR SLUDGE	
10.	3504E04	88J601576 DAF SLUDGE	
11.			
12.		THE ABOVE TWO LOW CONCENTRATION	
13.		SLUDGE SAMPLES ARE TO BE	
14.		ANALYZED FOR EP-TOX.	
15.			
16.			
17.			
18.			
19.			
20.			

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